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Public Forum
Montana Coal and Energy Development

Helena, Montana

February 3-4, 1973

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Edited by Richard L. Reese

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THE PUBLIC FORUM ON COAL AND ENERGY DEVELOPMENT AND THE PUBLICATION OF THESE PAPERS WERE PARTIALLY FUNDED BY A GRANT FROM THE NATIONAL ENDOWMENT FOR THE HUMANITIES THROUGH THE MONTANA COMMITTEE FOR THE HUMANITIES. THE OPINIONS EXPRESSED BY THE EDITOR OR BY THE FORUM PARTICIPANTS ARE NOT NECESSARILY THOSE OF THE NATIONAL ENDOWMENT FOR THE HUMANITIES OR OF THE MONTANA COMMITTEE FOR THE HUMANITIES.

PREFACE

The Fort Union Formation, underlying parts of Montana, North Dakota, South Dakota, Wyoming and Saskatchewan, is perhaps the largest coal basin in the world. The coal bearing section of this formation contains estimated reserves of one point three trillion tons. Hundreds of billions of tons of this coal underlie a large area of eastern Montana; some thirty billion tons are estimated to be "strippable", i.e., it lies in thick seams close to the surface.

Recently, interest in the rich coal reserves of eastern Montana has intensified dramatically. Increasing national demands for electricity coupled with chronic metropolitan air pollution problems which demand relatively clean, low sulfur, low ash coal of the type found in Montana, have touched on an unprecedented Montana coal rush.

The stakes are high, and America's largest coal, oil and energy combines are among the participants. The payoff may ultimately be measured not in millions of dollars or even in billions of dollars, but rather in hundreds of billions of dollars. A single acre of Montana coal land underlain by a fifty-foot seam, for example, will produce over eighty-eight thousand tons of coal. Even at the current price of one dollar and eighty cents to two dollars per ton at the mine (it sells for four times this in Chicago), the operation would gross one hundred seventy-six thousand dollar an acre.

But the highest stakes may lie not in coal production itself, but rather in potentially vast energy conversion facilities including mine mouth electrical generation plants, coal gasification and liquefaction plants, petrochemical complexes, and uranium enrichment plants. A

single coal-fired uranium enrichment plant now planned by Reynolds Metals for the coal fields of Wyoming, for example, will cost a staggering two point two billion dollars and will increase the taxable valuation of the entire state of Wyoming by two and one half times. Clearly, western coal is big business.

During the early weeks of 1973, a group of Helena, Montana citizens organized a public forum to deal with some of the issues regarding coal and energy development in eastern Montana. Partially funded by a grant from the Montana Committee for the Humanities, the forum was held in Helena on February third and fourth, 1973.

Representatives of industry, government, agriculture, environmental groups, and the general public were invited to participate on panels dealing with energy and public policy, air quality, water resources, strip mining and reclamation, and the socio-cultural impact of coal and energy development. Each panelist made a presentation outlining his or her position on the matter under consideration. Following the presentations on each subject, questions from the audience were entertained. These papers are a compilation of the presentations given by each panelist. A number of the panelists did not have prepared papers and spoke only from notes. The presentations of these panelists were transcribed from tape recordings.* Representative

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*The entire forum (with the exception of Rep. John Melcher's speech) was tape recorded. These tapes are available from the Montana Committee for the Humanities, 322 Turner Hall, University of Montana, Missoula, Montana 59801.

John Melcher, eastern district Congressman for the State of Montana gave one of the major opening addresses but his comments have not been included in the following collection because he spoke only from notes and the recording machinery was not functioning properly during his speech.

In reading the following papers, it is important to remember that the forum was held in February, 1973, about one-third of the way through the First Session of the Forty Third Montana State Legislature. Almost from the time the Legislature convened in January, 1973, it was clear that coal was going to be the dominant issue of the session. During the period when the forum was held, coal legislation was being actively debated but nothing had yet been passed. Therefore, panel participants were speaking at a time when no one knew precisely what coal legislation would emerge from the Legislature.

By the time the First Session of the Forty Third Legislative Assembly ended on March 24, 1973, several highly significant bills had been passed. Senate Bill ninety-four, the Montana Strip Mining and Reclamation Act of 1973, was signed by Governor Judge on March 16. It may indeed be "the strongest strip mining reclamation law in the history of this country", as the Governor had called for in his State of the State Message. On the same day the Governor signed into law House Bill one hundred twenty-seven, the Montana Utility Siting Act of 1973. This act, which grants the state a remarkably comprehensive degree of authority over the construction of energy related facilities, may, over the long run, prove to be the most significant piece of legislation to emerge from the Forty Third Legislative Assembly.

In addition to the above, the Legislature passed and the Governor signed a bill which quadrupled state coal production taxes on the two highest grades of coal and tripled the tax on the lower grades; a water use act which requires the issuance of a permit for water appropriation and which will provide the state with much needed information on industrial as well as agricultural water use; and the Strip-Mined Coal Conservation Act, the intent of which is to prevent the waste of coal and insure that once strip-mined land is disturbed and reclaimed, it will not be disturbed again.

These new laws, while not sufficient in themselves, could have a far reaching and profoundly beneficial effect in protecting Montana from the ravages of strip mining and uncontrolled energy production. Whether in fact, they will afford our state the protection they intend will depend upon the manner in which they are administered and the vigor with which they are enforced. The months and years immediately ahead will tell the tale.

Richard L. Reese
Helena, Montana
June, 1973

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THOMAS L. JUDGE

GOVERNOR OF MONTANA

It is gratifying for me as Governor of Montana to welcome all of you to Helena for this public forum on coal and energy development in our state. I want to express my appreciation to Rick Reese and to those Helena citizens who organized and sponsored this discussion on an issue of critical importance to the people of this state and the entire nation.

This forum and your presence here demonstrates that the people of Montana will not allow the development of our coal resources without the planning and control necessary to prevent destructive social, economic, and environmental impacts. Public forums such as this are important to discuss and disseminate information regarding coal development in eastern Montana. But more importantly, we must utilize this and other meetings to build the coordination and inspire the resolve essential to assure that our land is not destroyed and our people are not subjected to another cruel cycle of outside exploitation.

Government is changing. Citizen's are assuming their intended role as the dominant influence on government policy. In the past, there was a hidden substructure of government through which special and corporate interests applied pressure to achieve their objectives In Montana, this unfortunate history is coming to an end. Because of public concern and citizen participation in political affairs, the government of this state is becoming truly representative.

During the recent campaign, I visited all of the state's fifty six counties and met thousands of Montanans. The most important thing I learned was that the people of this state are extremely proud and protective of the quality of life we have in Montana. My administration is committed to serving the public interest by preserving the environment and protecting our priceless natural resources.

In the State of the State Message I presented to the Forty Third Legislative Assembly, I recommended the strongest strip mining reclamation laws in the history of this country. I believe this legislation should include selective denial, top soil replacement, state supervision of mining methods, a high bond and annual permits. There are presently several bills in the Legislature that will accomplish these objectives.

I recommended a ten cent per ton increase in the tax on coal to provide the state with a more equitable portion of the wealth that will be taken from the land.

I proposed a Resource Indemnity Trust Fund -- a levy of one half of one percent on the gross value of all non-renewable resources extracted in Montana. The proceeds from these levies will be inviolate until the trust reaches the level of ten million dollars. At that time, the yearly interest will be available to correct problems connected with resource development. When one hundred million dollars has been accumulated, the annual interest and proceeds will be utilized to reclaim the environment, develop recreational areas and provide opportunities for people to live and work in this state when our resources have been depleted. I believe this trust is essential. It represents the people's share of the resource wealth taken from the state that they settled and built.

This week I strongly supported power-plant siting legislation introduced in the House of Representatives. It is of critical importance for the state to possess the authority to regulate the location of mammoth power generation and conversion plants and associated facilities. The bill also requires that the appropriate state agency be notified two years in advance of the intial construction of these installations. We must have the authority to regulate the location of these plants and we must have adequate time to assess their impact. Anything less would be an invitation to a debacle.

I also recommended appropriation of funds to provide sufficient staff for the Coal Task Force. This group is comprised of representatives of six state agencies and the Environmental Quality Council. It maintains an effective working liaison with the University System. The objectives of the Task Force are to assess all phases of coal development, to formulate a policy for the state and establish coordination between agencies and levels of government, the universities, industry and private organizations. Recently, the Task Force released a situation report on coal development. I believe the document is a comprehensive and definitive statement on this critical issue.

Most of the present activity in regard to coal development is focused on environmental and resource issues. If the development proceeds according to federal government projections, it will have a tremendous social and economic impact on the people in the area. A single coal gasification plant would result in a direct and related population increase of twenty thousand persons in the immediate area. Numerous social and economic problems would result, and there would be a significant increase in the demand for community services. Presently, eastern Montana is a rural, agriculturally oriented region with a small

and scattered population. We must prepare now for the drastic social and economic changes that will occur in the area as a result of coal development.

This week, I met with the regional director of the Department of Health, Education and Welfare and I designated eastern Montana as this state's "Targets of Opportunity" area under the Allied Services Act. This means that all federal social service programs will be concentrated and intensified in the designated area. Increased federal aid and technical assistance will be available to solve the accumulation of problems resulting from the social and economic impacts of the development.

In my State of the State Address, I stated that we must answer three essential questions in regard to any development: 1. What effect will the development have on our environment, our economy, and our society? 2. What will Montana and our people receive for the development? 3. Is this what Montanans want for their state?

In an effort to answer the first question, I met with representatives of the President's Energy Council in Washington, D.C. two weeks ago. In these meetings I stressed the need for federal funds to conduct a comprehensive study of strip mining, power generation and conversion plants in Montana, with particular reference to the environmental, economic and social effect on our population. As a result of these discussions, I am today announcing our intention to request federal funding for a complete study of the urgent problems associated with the development of the coal reserves in eastern Montana. I am proposing a definitive, interdisciplinary study to be conducted over a period of five years to be funded by the federal government at the

level of seven million, one hundred thousand dollars. Of this total, more than three million dollars will go to the University System for research and technical investigation.

The coal study proposal, as it will be submitted to the federal government, will call for intensive study of the social and economic impacts, land and water resources, reclamation, and biological and environmental considerations. This study, if approved, must be the central force of our effort to plan and control the development of the coal reserves to assure that our land and water and our air are not ravaged, our resources not squandered, and our people not subjected to exaggerated social and economic conditions.

If the federal government will not provide this assistance, we must act singularly as a state to protect the public interest. We must conduct planning and research. We must enact legislation to preserve the quality of the air, the land, and the water and to protect the people of this state. We must establish guarantees that development of this resource will ultimately benefit and not destroy Montana. If these fundamental requirements cannot be met, development of our coal resources cannot be allowed to proceed.

THOMAS A. GWYNN

KNIFE RIVER COAL COMPANY

It is indeed an honor to be asked to speak to you today in the presence of such distinguished company. The audience and the speakers in this meeting represent many different interests, businesses, walks of life and certainly more than one viewpoint, but basically we are all interested in pretty much the same things. We are all concerned about maintaining the "good life" for citizens of this great country. Our efforts to achieve just this are greatly complicated by a truly complicated and almost overwhelming problem -- how do we find and develop the tremendous quantities of energy we need to maintain our society and at the same time preserve a quality environment for this generation and the generations to come?

I am completely convinced that we are in a major energy crisis and that it will become more difficult before it improves. In addition to my work with Knife River Coal Company, I have served for twenty years as a member of the Gas Reserves Committee for the American Gas Association, compiling annual reserve studies to measure the domestic consumption of gas versus the gas reserves already known and those being discovered. I also serve as a member of the Potential Gas Committee which attempts to project estimates of natural gas that may be found in the future. My work on these committees has given me crystal clear proof of the trends we have been in for many years and the projections we have published for many years which have gone largely unheeded by the public and by governmental agencies. Today the validity of these forecasts is obvious.

But it is useless to waste time talking about past history; rather we must concern ourselves with the present and the future. In the United States today

there is increasing concern about the energy crisis, but the public concern seems to be centered more on environmental problems than on our national energy supplies. It is essential that we start to give equal consideration to each of these important ingredients for a healthy and prosperous nation. Last spring many in this audience were at a meeting at Montana Eastern College at which time I stated that "we can't wait until a housewife gets no response to the flip of a switch to start coping with this problem." Unfortunately we have waited this long; and this winter, in many parts of the nation, very serious energy shortages have been manifest by by the closing of schools, the curtailment of manufacturing, shortage of various fuels for heating and industrial purposes, shortage of fuels for transportation purposes, and shortages of electrical power. Those involved in the energy field are working feverishly to overcome these shortages, but even as there is an increased need for energy output there seems to be a proliferation of obstacles placed in the path of those who are attempting to solve the problems.

We must be aware that our population is increasing as is also our demand for all forms of energy. And this is increasing at an even more rapid pace in other countries of the world. World population is expected to exceed six billion by the end of this century, and world-wide use of energy is expected to be triple or even quadruple by the end of this century.

It is therefore essential that our society establish a sound energy policy and that the total energy supply and demand problem be considered as one problem to be faced by this country together with other countries. Our entire society, from the individual citizen up, must participate if we are to assure adequate energy for our uses today and for the future at fair prices and on a dependable basis. This involves explanded exploration and it also requires accelerated research, both in the development of new energy sources and in better ways of protecting our environment while developing this energy.

Yes, our energy situation is extremely serious. Today, next to air and water, I suppose energy is the commodity in our life that is most taken for granted. Those of us who are blessed to live in this part of the country are particularly fortunate to live in an area having a clean and healthy environment, an area with relatively low population, and a region blessed with more than its share of the earth's resources. This, however, does not give us reason to relax. Our resources must be developed in this region if we are to maintain a "good life" and if we are to meet our obligations to our fellow man in other parts of the country and world. Yes, I said "obligations." We cannot live in isolation. We are dependent on every part of these United States, as well as other nations, for foodstuffs, automobiles, clothing and other manufactured goods and services that have become seemingly essential in our way of life. I am convinved that we have not only an economic but a moral obligation to share the mineral and energy wealth of our region with people in other parts of this great country.

I personally will not buy the statement made by so many that what we need are the "good old days." Back-breaking work from sunup to sundown for the bare subsistence, characteristic of the life of most of mankind in the past, is not what I want now nor do I think that it is what most of us want now or for the future. I think it is obvious to all of us what would happen in a very short time in this country if we were to go back to the wood-gathering type of society of the old days. Such a society would reduce this country to a desert in no time at all.

No, the population of this work and of this country has grown to a point where we are absolutely dependent on technology just to maintain life itself. The disaster that is so frequently predicted for mankind these days would certainly visit us immediately if our country were to retreat from the technological advances we have made. This technology makes it possible to support a much larger population than could possibly be supported by more primitive means, and retreat to a more primitive

society would cause major changes on the face of the earth and would ultimately condemn large segments of our population to starvation.

Now for a positive note. Our country is not running out of energy, but we are running out of cheap and readily available energy. This is not only true of our country but it is true of the entire world. We have simply become accustomed to plentiful energy and at relatively low costs. This situation is rapidly changing and we will have to pay more for what we enjoy. As the price for various types of energy rises, the law of supply and demand will operate and will result in new supplies and sources of energy. This is what will ultimately solve our crisis, not new governmental control or allocation of our present known sources. We can already see prices rising, and I don't know how far they will rise. The cost of finding natural gas, oil, or of producing coal, electricity and other forms of energy is sharply up from what it was a few years ago, and our society is imposing new expenses that will cause the cost to rise even further. Not the least of these new ingredients is the cost of protecting our environment.

The United States is not running out of fossil fuels. There are huge natural reserves of oil, gas and coal still waiting to be developed. While the rate of development of U.S. oil and gas resources has fallen behind consumption during the past decade, this adverse development has been caused by economic and political forces and does not result from a shortage of potential domestic resources remaining to be developed. The National Petroleum Council has estimated that there is potenti U.S. production capability of approximately three hundred fifty billion barrels of crude oil (four times the total of past production); one thousand one hundred ninety five trillion cubic feet of natural gas (approximately three and a half times the past production); and thirty-eight billion barrels of natural gas liquid (or three and a half times the total past production). But oil under the continental United States, off shore or in Alaska must be discovered, developed, processed and delivere to market. Since most of our growing needs must be supplied by oil and natural gas,

which at the present time are providing about three quarters of our energy, this will require a greatly accelerated pace of exploration and development and a greatly expanded availability of capital.

The petroleum industry is aware of these needs and it is also very much aware of the vital concern regarding the environmental conditions of this nation. The fact that our intensified search for oil and gas is taking us more and more to the remote or inaccessible regions is further complicated by the increased precautions necessary to protect the air and environment. Together these are requiring massive amounts of capital. During the 1960's, the petroleum industry invested approximately sixty billion dollars to develop reserves of oil and gas. The needs of the 1970's require an investment two and a half times this amount, or one hundred fifty billion dollars as a minimum. Even when new supplies of fuel and energy are found, it takes a period of time to develop the new source. For instance, in Alaska the north slope was open for leasing more than twelve years ago and the first important oil strike occurred four or five years ago. Even if the Alaskan pipeline were approved and construction begun shortly, it would be many years before the first barrel of north slope oil could reach the continental U.S.

Ragarding the nation's oil reserves, during the period of rapidly rising demands for energy, our reserves have been declining. At the present time, there is little more than a nine year supply of oil available at the current production rates compared to a twelve and a half year supply in 1958. Drilling rates have not been sufficient to generate the discoveries necessary to change this trend. The decline in drilling itself is the result of a cost-price squeeze that the industry has found itself in, making it difficult to attract the large amounts of capital needed to intensify the search for oil. During the past ten or twelve years, crude oil prices have advanced little more than twelve per cent

and during the same period the hourly wage paid oil and gas workers has risen over fifty per cent. Steel pipe and casing has increased approximately twnety-five per cent and other oil field machinery has had an average increase of more than thirty per cent.

Yet, contrast this with the fact that drilling for oil and gas is a costly, high-risk business. For every one hundred new field wildcat wells drilled, only nine strike oil and only two are of commercial significance. Furthermore, the "easy" oil near the surface has long since been found, and as a general rule, deeper wells must be drilled at higher costs. The cost of drilling for oil off-shore is two or three times as much as for an on-shore well. Complex technology is used to drill off-shore, and necessary, but expensive, precautions must be taken to protect the marine life, the recreational interests and other environmental conditions. Yet, some of our best potential and most hopeful hunting grounds for oil and gas are the off-shore areas of this continent. While environmental considerations are important, I am convinced that survival of this nation and assurance of adequate energy supplies dictates that the exploration of our off-shore waters must be expanded.

Nationally, our gas reserves have now dropped below twelve times last year's production. The demand for gas is going up and the demand cannot be met because available reserves to meet the demand are going down. This has been partly due to the unrealistic low price of natural gas at the well head, which has both artificially stimulated sales of natural gas and at the same time discouraged the search for new reserves. This has been changing during the past year or two, and the price for new gas supplies has been soaring. Again, we are fortunate in this region that the local companies serving Montanan's and this general region have more adequate gas reserves than the national average. Here in Montana we are already seeing greatly expanded drilling and exploration for natural gas

as the result of the increased prices being paid for gas. The Potential Gas Committee of the Colorado School of Mines (of which I am a member) and the National Petroleum Council are in general agreement that the undiscovered gas reserves still to be found within the boundaries of the U.S. exceed a fifty year supply for this nation. To find this supply will tax our technological know-how and will require huge expenditures of capital.

Coal, one of the resources to be discussed at great length in this meeting today and tomorrow, presently accounts for an excess of twenty per cent of the nation's energy supply. In my relatively short lifetime I have seen the coal industry go through a stage of great prosperity in the East, only to dwindle to a period of depression which more recently has been giving way to substantial growth. This industry has been affected by many factors, not the least of which are environmental control laws restricting the emissions of oxides of sulfur and nitrogen, ash and other pollutants. Much of the available coal in this nation is high in sulfur But, of course, Montana and other states in this region have huge supplies of low sulfur coal. Pollution control measures throughout the country have caused many cities to switch to other fuels, especially natural gas and residual fuel oil. (This has partially contributed to the fuel shortages we have experienced even in our region this winter.) The low sulphur content of our coals has, of course, greatly minimized the air pollution problems in Montana and adjacent states.

Technology, with improvements in mining methods and particularly the surface mining of our huge reserves close to the surface, has helped lower the price of coal. This is now being overcome by the greatly increased labor costs that are changing the coal cost trends. The hazards of this industry are important and the stringent new mine safety laws and the rigid enforcement of them has caused a considerable increase in the cost of coal across the country. Many mines

have been forced to close and we have seen this problem here in Montana. It is interesting to note that underground mining requires more than twice as many men to produce the same amount of coal as does surface mining. In addition, underground mining is only half as efficient and approximately half the coal is lost. Even more important, the loss of lives in underground mining has historically been at least three and a half times as high as that by the same production by strip-coal mining, making underground mining considerably more hazardous than surface mining.

Significant progress has been made in gasification of coal and there is, of course, a pilot plant in Rapid City. Gas produced from coal will undoubtedly become commercial before the vast oil shale deposits of this country are able to be utilized as an energy source. This is largely due to federal leasing policies that have discouraged development of oil shale deposits. Several coal gasification plants have been announced in various parts of the country and in this region, but such plants are still in the planning stage. They will be slow in developing, and I personally expect the first of such plants to be located generally in the Powder River Basin of Wyoming and Montana or in the four corners area of Arizona, New Mexico, Colorado and Utah. Plans for such plants have been announced in North Dakota, but as yet adequate reserves have not been identified and blocked out for those plants.

Generally speaking, the demands of a gasification plant are expected to be substantial, requiring perhaps as much as ten million tons of lignite or subbituminous coal per year for the production of approximately two hundred fifty million cubic feet of gas per day. Such a plant is also expected to consume upwards of twenty five thousand acre feet of water per year. To relate this amount of production to terms readily understandable, production from a twenty-five foot coal seam would cause disturbance of approximately the same acreage presently

required for construction of about five miles of interstate highway. The only difference, of course, is that the highway construction takes the land out of use relatively permanently, whereas lands mined for coal can be completely restored to original productivity in a period of time.

Coal production is plagued with many environmental problems, some that are real and some that are imagined. Here in Montana it has become a favorite subject for everyone and considerable legislation is under consideration during this session. Montana will undoubtedly have rigid reclamation laws after the forty-third Session of the Montana Legislature has adjourned, and there will probably also be new tax measures on the books. There is a critical need nationally for this source of energy, and I am convinced that a major part of our energy need will be met by coal during at least the next fifteen or twenty years. With very substantial reserves in Montana, Wyoming and North Dakota, it is possible that competition will develop between these states for providing this coal.

The industry is firmly in favor of comprehensive and specific reclamation laws requiring full restoration of the lands mined to approximately the original conditions. North Dakota already has such laws and all of the companies mining in North Dakota are restoring the lands to the original topography and are saving and replacing topsoil. Indications are that Montana's reclamation laws will be very specific in this regard.

Nuclear power will help to supply the nation's future energy needs, but progress is far slower than anticipated. Costs of nuclear generating facilities were underestimated and government subsidies or financing has been required for many plants. In addition, conservationists have been worried about thermal pollution, and ordinary citizens have been concerned about radiation hazards; the two have joined forces to delay or completely block the construction of some new nuclear plants, as well as to prevent production of power from existing plants. In my

opinion, this delay has often been unwarranted and is helping impair our national welfare during a time of energy crisis. Siting for such plants is a problem, regardless of where they are located. Pressures are exerted to prevent their construction, whether the siting is in relatively populous areas or in relatively unpopulated desert areas. Certainly if the energy crisis is to be solved or alleviated, it will be necessary to perfect the breeder reactor and move towards practical use of nuclear fusion. This is needed to meet the rapidly doubling and redoubling of the nation's energy demands every ten or fifteen years. Hopefully we are not too far from the technology needed to develop these sources of energy. Lead time, however, is stretching out for our plants today, and of the twenty-seven nuclear plants ordered in 1971, the average lead time is about seven and a half years. This lead time is quite a problem when you consider that our market is growing at the rate of seven to eight per cent each year. The Atomic Energy Commission recently estimated that the breeder reactor would be available in about the mid 1980's.

While there is a great deal of discussion concerning them, other energy sources remain relatively unimportant. Despite huge dam-building programs of the 1920's and 1930's, hydroelectric power supplies only about four per cent of the total energy needs and this cannot be greatly increased because sites for new major dams are not plentiful. Furthermore, suggestions for constructing such new dams are meeting ever increased resistance.

Oil shale and tar sands are a promising future source for oil. Commercial development is still many years away, partly because of the government control of these lands and the federal leasing policies. Nevertheless, very substantial reserves do exist in our oil shale lands.

Solar energy is looked upon by many as a perfect and environmentally clean source of power. Certainly the enormous amount of sun power intercepted by this

earth is at least one hundred thousand times greater than the entire world's present installed generating capacity. Unfortunately, this power is greatly defused over the earth's surface and is difficult to concentrate. While direct solar energy can conceivably be used for small scale special purposes uses, the problems of building larger solar energy plants are greater than the average layman realizes. A five hundred megawatt plant, for instance (about the size of the Basin Electric plant in Central North Dakota) would require two hundred, fifty thousand solar collectors covering eleven square miles. Thus, hundreds of square miles would be required for the power plants needed to supply our region alone, and this in itself would be an environmental blight of substantial size. Contrary to what its proponents often say, desert real estate is not as readily available for this usage as some think. Furthermore, solar power so generated is estimated to be many times more costly than conventional power. I sincerely hope that we will be able to make a breakthrough in using this source of energy, however.

Other substitutes for our needed energy include liquified natural gas, which is an extremely expensive and limited substitute, synthetic natural gas, geothermal energy and several other minor potential sources of energy. There has been a great deal of talk about geothermal energy recently, and certainly we will see increased harnassing of the heat energy from within the earth. Nevertheless, the depth necessary to reach this is extremely variable over the face of this globe. While there are a few potential locations for this in Montana and Wyoming, as well as in other western states, the potential sites throughout the country are not plentiful. Accordingly, I suspect that those of us in this room will never see it supply more than a minor percentage of our energy needs.

Love is not all it takes to make the world go round; it also takes energy. One knowledgable scientist said that, "The average consumer has no idea how

really short of energy we are today." Somehow he has been impressed with the idea that we can get all we need from hidden reserves; that we can make tremendous quantities of oil or gas from coal or naptha now; that we have a thousand year's supply of oil from shale which is immediately available; that geothermal heat will answer all of our problems; that unlimited nuclear energy is just around the corner; that solar energy, fuel cells, tidal energy, and even manure and garbage will save us from ever becoming dependent on foreign sources.

"And that could be right. What he doesn't know is that most of these non-petroleum forms of energy will cost many times what oil and gas cost today and that most of them may be from twenty to fifty years down the road."

Former Secretary Hickle has stated it well, "There are exciting possibilities in these future energies, but it is painfully obvious that for the next two or three decades the United States will remain heavily dependent on fossil fuels."

Ladies and Gentlemen, this is where the coal resources of our region come into play. They are needed in the near term future of the next two or three decades to help meet the critical energy needs of this nation. We should feel a moral burden in helping meet these needs and if we place wise laws on our statutes to exact careful restoration of our lands, economic benefit can accrue to our state without irreparable environmental damage.

I

ENERGY AND PUBLIC POLICY

REQUIREMENTS, SOURCES, ALTERNATIVES AND ECONOMICS

HARRY L. BILLINGS

DIRECTOR OF EDUCATION AND INTER-GROUP RELATIONS, MONTANA AFL-CIO

In addressing myself to the topic of this panel...a topic which by actual letter count is even longer than the title of my position with the Montana State AFL-CIO...I believe that public policy and how we effectively develop it is the primary consideration.

While I represent labor, and jobs are an immediate and continuing concern of ours, I would point out that well-paid employment is only one of the several colors in the total environmental spectrum.

Make no mistake about it, people must have jobs if they are to adequately provide for their families. But jobs must never be considered the holy alter at which we pay homage. . . to the exclusion of every other environmental value involved in enhancing our limited stay on this earth.

Without pure air, we gasp.
Without pure water, we choke.
Without a pleasant landscape, our eyes are saddened.

I am not impressed by the "panic-button" approach to dealing with the coal strip mining and energy-manufacturing era now dawning in eastern Montana. I've too often witnessed the results of hastily-considered, poorly-drafted legislation. Invariably, the end result has been to the disadvantage of the citizenry as a whole.

Senator Mike Mansfield in a recent statement summed up in a few succinct words my thoughts when he said: "I am not convinced that the nation's energy crisis is truly what the phrase indicates. . . I see no reason for panic. An adequate supply of energy for the future is dependent on a coordinated, well-planned effort, utilizing all possible sources through environmentally sound

processes..."

Without such coordinated planning, we can have, as Mike pointed out, "a similar situation which developed at the beginning of World War II and which we now have Appalachia" as a result.

We of the Montana State AFL-CIO do not believe it is necessary to create another Appalachia in order to build a sound job base and a prosperous economy in the coal areas of eastern Montana.

We cannot concur with those who would put an "off limits" sign on Montana. . . who would ban all exploitation of our resources. Such pure idealism is much too narrow in scope, for it pits the desires of the few against the needs of the many.

Nor do we concur with those who view a resource as something to be exploited at the cheapest possible cost, and once it's gone leave all of us, and all who come after, much poorer indeed.

There is a middle ground, and there my organization stands. That position is described in a recently-drafted policy statement by our Executive Board. . . a policy statement which is solidly based on mandates from our delegate conventions.

A pertinent part of that statement is: "We request the highest priority be given to the immediate drafting of 'ground rules' (by the Legislature) governing the restoration of coal strip-mined lands and the preservation of present air and water qualities, thereby permitting the uninterrupted development of the coal resource. This positive step we believe to be the only alternative to the demand for a moratorium, or legal action to enjoin further extraction until strict environmental safeguards are enacted and enforced."

There are a number of measures currently before the Legislature which are in line with the above objective. There is no doubt in our minds that, the Legislature willing, we can substantially achieve the two-pronged goal of development and environmental protection.

However, we must not allow ourselves to be stampeded into hasty action. If our choice is to be short-term discomfort... . or lasting environmental degradation. . . then let us courageously face up to the momentary limitation. . . and to hell with the "panic button"!

BURTON B. BREWSTER

RANCHER (BIRNEY, MONTANA),

AND FORMER MEMBER OF EXECUTIVE COMMITTEE OF MONTANA STOCKGROWERS ASSOCIATION

The ranch that my family and I have put together started with my Father's one hundred sixty acre "squatter's right" in 1882. It now comprises twenty-four thousand acres of deeded land. This has taken the cows ninety years to put together and it has been put together without any outside source of income. It has been accumulated from the land itself -- grass, water and cattle.

Ranches are put together in many different ways. Some operate on mostly deeded land -- they are the fortunate ones -- some are dependent upon forest permits, some rely heavily on B L M land and the rest are in between with a mixture of deeded and public lands. To further complicate the pattern is the coal and oil ownership under deeded acres.

I have mixed emotions about the land. In one sense, one's deeded land should be his to do with as he pleases. If you agree with this concept, then you are for the exclusion of strip mining from the eminent domain law. If you are for the exclusion of strip mining from the eminent domain law, then strip mining is not a "necessary public use." If strip mining is not a "necessary public use", it is, in effect, a private matter and what I do with my private land should be of no concern to environmental groups. I resent being told what I should or should not do with my personal property by people from outside who know nothing about our country, and there seem to be flocks of them.

We hear rumors, and I know there is great pressure from many groups to eliminate all grazing from public lands. We also know there is considerable pressure to mine coal in the Birney, Decker, Ashland and Kirby areas. This all confuses the issue and the rancher, dependent upon public lands, has a tough decision to

make -- who does he want for a partner, the environmentalist or the coal miner? Whichever his choice, the rancher's life is not going to be the same. In the one case, he will find himself with a beautiful view but no cattle. In the other case, he will find himself rich with some land wrong side up. It is not an easy choice to make, but I venture to say that if grazing privileges were taken away from all public lands, a very small percentage of the ranchers in the Birney-Otter Creek area could survive. Think what this would do to the price of meat.

Now, regarding the potential coal development in the Decker-Birney study area, my general recommendation is that where possible, the principle valleys and the larger tributaries should be protected from strip mining and processing plants, because the valleys produce a hay base and the tributaries provide a water base for livestock. But I do not make this recommendation to the extent that it jeopardizes any surface owner's individual rights to take the money or take the environment.

The elements we are concerned with in coal development are reclamation, air pollution, water and people. I am not worried about reclamation because so many people are going to take care of that problem for me. If scientists can land men on the moon I am sure that they will find a way to take care of air pollution. That brings us to water. For seventy years, I have watched the Yellowstone, the Tongue and the Powder Rivers, in flood state, wash away more land than the strip miners will mine. The only place this could be reclaimed is in the Mississippi Delta. Tongue River washes out my dam, floods my fields and sometimes my basements. This water is lost. It should be controlled and used in Montana. But people, the pollution of people, will be our insoluable problem.

About forty-five years ago they started stripping coal at Colstrip. The spoil banks are not beautiful because no reclamation was attempted but they blend in with the surrounding sand rocks fairly well. The pits have been a recreation center for Rosebud County with trout fishing and swimming, and the area has been used for the site of 4-H club camps. I venture the statement that Armels creek, the

principal drainage of the Colstrip operation, has more unpolluted water available for livestock now than forty years ago.

The leasing of federal coal will, in most cases, be the determining factor in coal development. One partial solution to this problem may be trading privately owned (fee) coal, ton for ton, or B T U for B T U, for federal coal, in areas where there is less environmental impact. The other thing to remember is that the surface owner should be given first consideration because he is the one who has the most to gain or lose.

Now let us take a look at the economics of coal development. You are all familiar with the term "acre-foot of water", now we will be talking about an "acre-foot of coal". An acre-foot of coal will weigh approximately one thousand, seven hundred fifty tons. A seam twenty feet thick will produce thirty-five thousand tons per acre. The owner of this coal can get seventeen cents per ton royalty, or more, amounting to at least five thousand nine hundred fifty dollars per acre. If one owns one section of this coal land the figure would be three million, eight hundred eight thousand dollars. Even if the government, or someone else owns the coal, the owner of the surface can get one tenth of the royalty offered for owned coal. Now using a published figure of twelve billion tons in the Decker-Birney study area of strippable coal, the owner value is over two billion dollars.

To carry this to the final analysis, remember that the Birney-Decker study area is but a small part of the whole coal field. There is Sarpy Creek, there is Colstrip, there is Foster Creek and there is Powder River with an estimated thirty-three billion tons of coal available in the coal field. At seventeen cents per ton royalty, we are talking about five billion, six hundred ten million dollars of value available to the coal owners. These are figures which should be of interest to any tax payer.

Attacking the ecology movement today is like sneering at motherhood, but this too we feel should be subjected to rational examination. Like everybody, we're for ecology, but, like everybody, we are not entirely sure what we want to preserve or what we want to pay to preserve it.

If coal mining persists, the country will never be the same, but most could survive in the cattle business and hopefully use coal money to make a better home for one's cows. One should be able to do things for his own cows that the cows have not been able to do for themselves.

As I see it, this is a natural resource that should be developed in an orderly fashion, with laws stringent enough to control the environmental problems but lenient enough to encourage it's development, with the federal government, the state, the county and the land owner each getting their fair share. This resource is of no value left in the ground and it is large enough to broaden the tax base and benefit all tax payers.

Several thousand years ago we inherited the coal from the dinosaurs. For whom are we saving it, the Martians?

J. A. McELWAIN, EXECUTIVE VICE PRESIDENT

MONTANA POWER COMPANY

Energy is probably the most important component of our environment. We have never had a world that did not use energy. In the earliest days of history the only energy available to man was the energy of his own muscle power. Slowly, over the period of thousands of years, men learned to put energy to work -- the energy of flowing streams, the energy of wind, finally the energy locked in fossil fuels, and atomic reaction.

As use of energy increased, standards of living rose. Repeated studies show a direct correlation between the use of energy and income. The reason is clear. By using energy, we get work done. We increase productivity. Today, over ninety eight per cent of the work done in this country is derived from energy other than muscle power and we continue to devise new ways for energy to work for us.

As use of energy increased, hunger, dirt and disease decreased and our longevity of life nearly doubled.

Under the complex strains of our life today, each of us can sympathize with the concept of seeking refuge in the supposed simplicity of the life of yesterday. But nostalgia tends to color judgment.

If it were possible to return to yesterday -- to the ax, the plow, the horse carriage, and the water wheel -- we would not only be distressed by the unhealthy environmental conditions, but I believe we would be shocked by the fact that nearly everybody was

genuinely poverty-stricken -- certainly in comparison with what we are accustomed to today.

We are a country which lives on energy. Be developing our energy resources and harnessing them in machines, we have achieved a standard of living that is far beyond the dreams of most of mankind through most of history.

Looking backward, then, is not the answer. A return to a lower standard of living would go against the economic and social advances to which the United States is committed for all its citizens.

We must accept the challenge and premise that an adequate supply of energy is absolutely necessary to the future of the United States and to the future of Montana.

Coal is the most abundant of our fossil fuel world energy resource, representing seventy-three per cent of our total. Oil is second with eighteen per cent and gas third, with nine per cent.

The United States' proven coal reserves are equal to about two hundred years supply at our present rate of consumption, but the total reserves in the United States are estimated, at 1970 production, to last approximately one thousand five hundred years. It is the only fossil fuel we have in adequate domestic supply.

The real fuel problem for the United States is oil and gas. With sixty-eight per cent of the proven world reserves of oil being located in the Middle East and North African countries, the future oil supply of the world becomes entwined in Middle East politics and intrigue.

In 1970, we imported about twenty-three per cent of our oil and three per cent of our gas requirements, our gas import primarily from Canada. You can see growing dependency on foreign supply for our future oil and gas supply. It has been predicted that by 1985 the United States will import fifty per cent of our total oil and gas requirements. This situation raises two very serious problems for the United States to face in the future.

The first one is the matter of balance of payments of our import and export flow of money. In 1970, we spent about four billion dollars in gas and oil imports to the United States. By 1985 it is estimated that we will have an outflow of about thirty billion dollars a year for oil and gas alone, if we import fifty per cent of our oil and gas needs from foreign sources.

This raises the very perplexing problem of whether or not the United States, in its world trade and in the productive capacity of our country, can pick up that twenty-six billion dollar increase in selling goods and services to other countries so that we will have a balance of payments in our world trade. We haven't been able to keep a favorable balance of payments in the last few years when we spent only four billion dollars on foreign gas and oil. The balance of payments of inflow and outflow of capital, in recent years, has been one of the United States' most nagging problems and the one which only recently caused a devaluation of our dollar.

The second serious problem has to do with the matter of

national defense. Sufficient energy is an absolute necessity to our ability to defend ourselves from outside attack. The question then is, can the United States afford, from a national defense standpoint, to depend upon over fifty per cent of its oil and gas energy needs coming from outside of our country, and most of it from countries which are unstable, or from which in the past, we have not had good diplomatic relations.

These two questions are most grave and must be weighed very closely in the future energy policies of this country. I submit that public policy requires that we have an adequate source of domestic energy.

Electric energy in 1970 represented approximately a little over twenty per cent of our total energy use. By 1990, electric energy will furnish approximately fifty per cent of our total needed energy in this country. In 1970 coal represented forty-nine per cent of the fuel used in making electricity, gas twenty-four per cent, oil eleven per cent, hydro fifteen per cent and nuclear one per cent. By 1990, it is predicted that coal will represent approximately thirty per cent of the fuel for electric generation, gas six per cent, oil ten per cent and nuclear power will represent forty-eight per cent. Actual use of coal, however, will increase by about seventy-five per cent by 1990. This is true because it is predicted that by 1990 the electric generating capacity needed in the United States will, at a minimum, triple from what we have in 1972.

You might well ask, do we need all that energy and electricity?

Can't we cut down on electric consumption by outlawing the electric toothbrush? The answer to that, in my opinion, is no, not by any significant amount. In 1970, only twenty per cent of the nation's electric consumption was residential. Eighty per cent was used to do work for us in our industries and on our farms. In 1968, there were some fourteen and a half million workers employed in the United States' manufacturing industries. Each of these workers required an average of thirty-five thousand eight hundred kilowatt hours of electricity annually to perform his job.

Put in other terms, the average U.S. factory worker today has the equivalent energy of six hundred men at his disposal through electrified production. Without this electrified production, automobiles built today with the methods of just a life span ago, would cost almost one hundred thousand dollars each. If we are to maintain our position in world markets, this use of electricity must, and will, continue to increase substantially.

The average electrical usage for residential use is the energy equivalent of between thirty-five and forty full time servants. For that in Montana you paid approximately fifteen dollars per month. When you drive a car down a road at seventy miles an hour, you use the equivalent of one thousand five hundred slaves. The gasoline that supplied this energy would cost you less than two dollars an hour.

With the shortage of gas which has developed in this country and the greater dependency on foreign sources for our oil, it is my opinion that this country must develop and use its coal resources

Montana is fortunate to be blessed with a large supply of low-

sulphur, sub-bituminous and lignite coal. We should not and cannot take an hysterical approach to the use of this resource. It is not an albatross around our neck, it is a godsend, and our wise utilization of this great resource will prove to be one of the most beneficial things that has happened to Montana in its entire history.

ALBERT G. MELCHER

P.E., DIRECTOR OF TECHNICAL SERVICES

ROCKY MOUNTAIN CENTER ON ENVIRONMENT, DENVER

In a recent review of the North Central Power Study, Phase I, the Rocky Mountain Center on Environment stated that "The North Central Power Study dramatizes one of the most massive potential environmental problems in America.* In this panel today, I wish to emphasize several parts of the problem: the interrelated questions of sources, requirements and alternatives.

Basically, public policy in energy must be devoted to developing a strategy of creating best alternatives from four major components:

1. LAND USE: ecosystem characteristics, along with water resources and air quality, and social and land economics factors. (The studies proposed by Governor Judge, along with the strip-mine reclamation bill and utilities siting bill, are essential in addressing this component.)
2. ENERGY SOURCES AND CONVERSION TECHNIQUES:
3. TRANSMISSION AND STORAGE OF ENERGY: moving energy, in various forms, from point A to point B, and storing it in one form or another at any place.
4. UTILIZATION: consumption, including efficiency of use controls and the "energy mix" in consumption.

Too many people, in asking about alternatives, are concerned only with the techniques for production of energy, such as solar heat collectors, solar

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*Wanted: A Better Approach to Energy Planning, 1972, ROMCOE, Denver, Colorado.

photovoltaic cells, magnetohydrodynamics (MHD), nuclear reactors, etc. This is critical, but it is not the only component of our ability to create alternatives, nor can it be considered in isolation from the other components.

Unfortunately, and perhaps tragically, we do not have the institutions--public and private--to put together the best alternatives to serve the public health, welfare and safety and to provide for the common weal.

A word about time and the public. The "public" is everyone affected by a decision, including future generations. In our time frame, we must think in terms of future generations; are our decisions in terms of their best interests, or simply in terms of our immediate needs and greeds? Our time frame must be in ecological time, in the hundreds or thousands of years in which ecosystems progress from primary or early successional stages to conditions of dynamic equilibrium. Twenty and thirty year planning periods, or thirty-five year amortization periods, are not appropriate time spans for thinking about the problem of energy. Neither are depletion times for non-renewable resources. Coal, for example, may not be depleted world-wide for twenty-three hundred years, according to some "linear growth" forecasts, or it may be exhausted in one hundred ten to one hundred fifty years, based on forecasts using interactive, dynamic modelling with exponential increases in consumption and population as developed by MIT for the Club of Rome in their study, The Limits to Growth.

The UTILIZATION component includes, and must emphasize conservation of energy. Conservationists for years have been calling for a conservative approach to consumption of energy, for conservation of resources. However, they have not been believed: "vox clamantis in deserto." Let me quote two non-conservationists.

The first is Admiral Hyman Rickover:

> The problem we face is probably the most serious since the inception of our Republic. Americans must change and adapt to the possibility that less energy must be consumed in order to save our resources. We are energy rich today, but find ourselves in the unenviable position of the prodigal son who lives luxuriously on his inheritance but after a brief moment of glory is left with nothing to his name.

To quote another non-conservationist, Joseph C. Swindler, Chairman New York Public Service Commission:

> I advocate only prudence in dealing with limited resources and dampening the flames of demand which it is no longer possible to satisfy without long-term damage to the energy resource position of the United States and the world and risk of serious environmental consequences. . . The time has come, it is overdue, to develop and put into effect a broad national program of energy conservation designed to stabilize the total consumption of energy at as early a time as is possible, consistent with avoidance of serious economic disruptions. Many users of energy are inexcusably wasteful in the light of this country's and the world's resource positon. Others are of such small social and economic value as to be dispensable with minor social sacrifice.

The Office of Emergency Preparedness recently released a study of energy conservation. They concluded that energy consumption could be reduced as follows;

> Mid-term (1980): from ninety-six quadrillion btu per year to eighty one quadrillion btu per year;
>
> Long-term (1990): from one hundred forty one quadrillion btu per year to one hundred two quadrillion btu.

I feel that their suggested measures (mass transit, improved auto engines, better building insulation, improved recycling, higher prices, etc.) are <u>not drastic</u> or <u>severe</u>. If rigorous efforts to control consumption and improve efficiency of use were instigated, reductions could be greater.

The RAND Corporation, in a California study, concluded that energy conservation measures could result in a seventy two per cent reduction from the year two thousand "Conventional Utility Projection" and only a sixty-five per cent increase over 1970 demand (assuming an eighty per cent increase in the number of households).

At the end of this paper, a simplified figure is presented to indicate the effect on pollution reduction and resource exhaustion of lowering the consumption of energy.

Turning to technology, I believe that we must emphasize 'income" sources of energy, rather than non-renewable "capital" sources. We must also emphasize efficiency. For example, in conversion of coal to electricity, conventional plants are about thirty-five per cent to thirty-nine per cent efficient.

MHD should be about sixty per cent efficient. This means that fifty eight per cent to sixty five per cent as much coal is needed to produce the same amount of electricity if MHD is used instead of conventional steam-electric facilities.

An "income" source is solar energy. In Arizona, Dr. Aden Meinel, based on two years of low-budget research, believes that a system of conversion of solar energy to heat, and hence to steam-electric production, can be economically feasible by 1980. Solar energy, focused by lenses, would be transformed to heat stored in molten sodium. By use of mass production facilities, operating and amortized over a thirty year period, the economics are competitive with present sources, he believes. His research must receive additional funding immediately.

In our institutions, we need a number of changes. To speak of only

one such change, we need better analysis and planning. The study proposed by Governor Judge, and perhaps the Northern Great Plains Resources Study of the Department of the Interior, are essential. In a comparable situation, ROMCOE has been a catalyst in creating a new approach in oil shale planning. State and Federal government, industry, environmentalists and academia are joining together to assess oil shale problems and potentials. The coal problem of the northern great plains could be addressed similarly. We urge this approach as a start in the needed changes in institutions.

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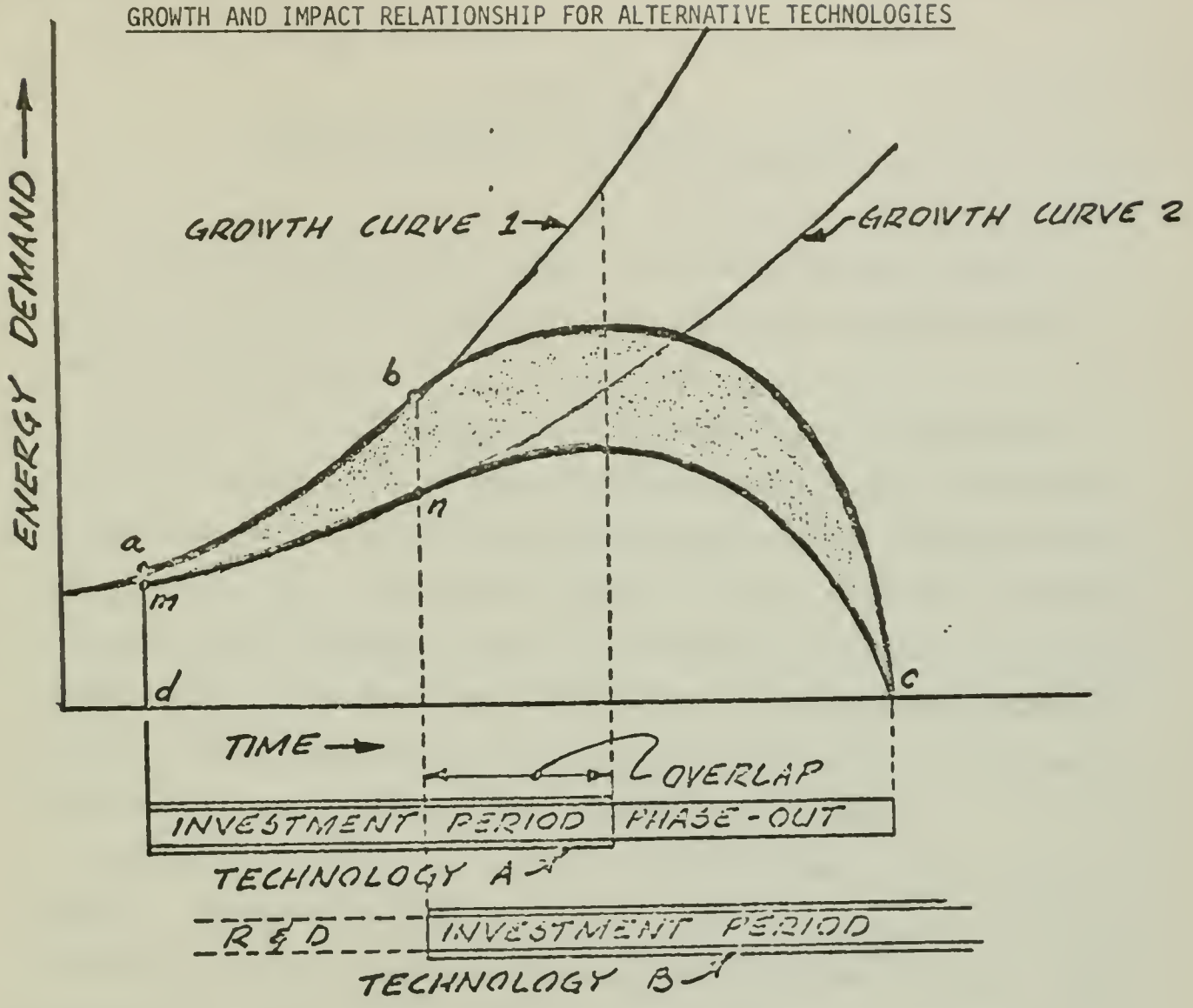
GROWTH AND IMPACT RELATIONSHIP FOR ALTERNATIVE TECHNOLOGIES



Technology A = high pollution, high consumption of nonrenewable resources

Technology B = low pollution, low consumption of nonrenewable resources (such as MHD or solar energy)

With high growth rate, Curve 1, energy produced using Technology A is represented by area abcd. Technology B phases in at "b," but there is a long period of continued high impact due to investment in Technology A; this impact continues well after the introduction of B. With low growth rate, Curve 2, energy produced by Technology A is represented by area mncd. The shaded area abcnm represents the impact-saving effect of the lower growth rate before low-impact technology can be brought on stream. It is also apparent that the longer B is delayed (points b,n moved to right), the greater the impact difference between Curves 1 and 2.

VII. PUBLIC DECISION-MAKING IN ENERGY AND MINERALS

In discussing energy (or any other issue) and its relation to public policy, we should determine who decides public policy, and understand the decision-making process.

In important respects, public policy regarding energy is not decided by public officials, at either federal or state levels. A few oil companies, not your government, deal with Middle East nations regarding availability and cost of oil and gas. A few pipeline companies, not your government, deal with the Soviet Union for Siberian natural gas. Similarly, regarding an agricultural issue important to Montanans, the sale of wheat last year to the Russians, it was a few milling companies, not your government, which made the arrangements that sharply affected price, supply, transportation and storage.

Lack of independently obtained data in the public sector, data regarding ownership, operations, and reserves, characterizes the energy issue. Ironically, the Soviet gas deal may fall through because the Soviet government is reluctant to share its gas reserve data with the U.S. corporations with which it is dealing.

In any case, the U.S. Government will operate from a basis of ignorance. Only the natural gas companies, not the government, have the basic data on domestic gas reserves.

In Montana, the few companies with large coal lease holdings are, almost without exception, subsidiaries of oil companies, utilities, and railroads, or leaseholds assembling packages for them. The public names of leaseholders can be deceiving. For example, tracts in Rosebud and Treasure counties, as well as in Wyoming, are leased to Ayrshire Coal Company. Ayrshire Coal Company is not an affiliate of Barry Mitchell's Ayrshire Dairy. Ayrshire Coal is a subsidiary

of American Metals Climax, which is a subsidiary of De Beers Consolidated Mines, a huge South African conglomerate. So, given the present state of our eminent domain law, foreign corporations are among the companies which, having subsurface rights, can condemn Montana land.

The more significant control of Montana and national resources, however, rests with less than a dozen eastern banks, most of them in New York. During recent years, through trust agreements and the use of multiple aliases, they have quietly acquired voting rights to stock in thousands of pension funds, employee benefit funds, estates and other investments. The stockholders of middle America have lost their votes.

The corporate election and decision-making process in the United States today closely resembles the Soviet system. A single slate of candidates appears on the ballot. Some companies do not permit casting of negative votes. Meaningful participation by those minority stockholders who retain voting rights is at best costly and time-consuming. Often they cannot even determine who holds voting rights, in order to propose alternative candidates or policies for consideration. Kremlin-like secrecy surrounds corporate decision-making. And Kremlin-like propaganda attends announcement of the decisions which are herelded as the result of overwhelming support from stockholders.

Because minority stockholders are widely-dispersed, and because of corporate secrecy and procedures, a bank or a few banks with voting rights to as little as ten per cent of the stock can usually control. In fact, one former United States Senator with considerable banking experience said that less than five per cent of the stock is often sufficient to get the majority to do the wishes of the minority. That is because bank control of the legislative branch of corporate government, the Stock Branch, is supplemented by its control of credit, the Money Branch, as well as the third Interlock Branch of corporate government, which helps explain why Chase

Manhattan has two hundred ninety-eight vice presidents strategically located on boards of directors.

The major banks which control the energy industry use a portion of their immense resources to issue alarming reports on the energy crisis, which echo similar reports prepared by the energy industry and issued in the name of the Federal Government. I have recently read four similar energy reports, all concluding that energy companies require lower taxes and higher profits, and that what little is left of natural gas regulation should be halted forthwith. These reports were issued in the name of the Department of Interior, the Federal Power Commission, the American Gas Association and Chase Manhattan Bank. Some of the same companies, even some of the same individuals, prepared these similar reports. What appeared to be broad support for the recommendations was actually repetition of essentially one group's proposals.

This concentration and secrecy of decision-making and opinion-making in important areas of public policy is in my opinion the most serious domestic problem of the Seventies. You do not hear about bank domination of decision-making on large banks. The C in CBS stands for Chase Manhattan, which has voting rights to about fourteen per cent of the network's stock. The B in ABC stands for Bankers Trust, which has voting rights to about ten per cent of that network's stock. The only televised discussion of some of the realities of bank control that I have seen was on the educational television network. As you may have heard, the President is now clamping down on ETV, taking responsibility for programming away from local station managers and imposing control by his Corporation for Public Broadcasting. Literate but controversial conservatives, such as William Buckley, will probably soon go off the air, along with William Moyers, whose investigative reporting added spice to the bland television diet.

So, in order to affect policy, we should all clearly understand that policy is now established by corporate government, and that we have to change corporate government in order to change public policy. If and when we decide to alter the life style of a huge conglomerate operating in Montana, we can change more than energy policy. We can also get to some of the transportation and agricultural problems that plague this state and this entire region. The company with the most coal rights in the nation is also fabulously rich in Montana land, timber and mining properties. It is also bank-controlled. Three New York banks, Chase Manhattan, Bankers Trust, and Bank of New York, hold more than twenty per cent of the voting rights in the Burlington Northern. When a company with its resources cannot provide the transportation service that was the original condition of its land grants, it should be divested of its assets in proportion to its reduction of service.

It is time to abandon the Soviet system of corporate election and decision-making. It is time to return to the American system of weighted voting in corporate elections espoused by William Penn and Alexander Hamilton. The "one share one vote" idea has no basis in common law. Weighted voting--reduction of the voting power of large stockholders -- was designed to prevent the concentration of bank control which Hamilton prophetically foresaw. But weighted voting was lobbied away, state by state, although it is still used in some other capitalistic countries.

There are other tools to be developed and used to increase public participation in decision-making and to make wiser use of energy resources: counter ads on T.V. and radio under the fairness doctrine, legislation to implement the consumer counsel provision in the new Constitution, state or local public utility districts, citizen suits, corporate disclosure laws, revision of rate structures under which, at present, the poor subsidize the large customers most responsible

for both waste and pollution.

But I want to emphasize the inadequacy of splints when surgery is also required. The bank-energy companies have decided that Montana is next on their list for development. Their awesome political, economic and media control is in operation now. If tough federal and state laws are passed, the bank-energy combine will do its best to see that the laws are not enforced and that profits rise faster than costs. That is the name of the game, and Montana cannot expect much help on either enforcement or price protection from a national administration which has adopted as its policy the program and priorities of those who bankrolled it into office.

So to affect public policy in the energy field, it is necessary that concerned citizens become involved in the most powerful and least understood type of government--corporate government. It needs the active participation of stockholders, study by the universities and civic groups, and surveillance and control by the legislatures and Congress. I can think of no more appropriate issue for public attention as this country prepares for its bicentennial. It is truly in the Spirit of '76.

II

COAL, ENERGY, AND MONTANA AIR

ROBERT J. LABRIE

ASSISTANT CHIEF ENGINEER, GENERATION, MONTANA POWER COMPANY

It's kind of amazing how rapidly times have changed, for instance, when I was a child growing up in the Los Angeles area, I never heard of the word, air pollution. Now you and I are very much aware of it. We are teaching our children to be aware of it. This is good; the emphasis and effort to control air pollution has got to enhance our environment. It's got to be one of the best things to come out of this era. I believe this sincerely. My company, Montana Power, also feels that this is one of their major responsibilities. They have three responsibilities: to meet the needs of their customers, to keep the costs down, and to protect our environment, and this means a heavy emphasis on air pollution control. This is evidenced by the tremendous investment that we are making at Colstrip to keep the air clean.

Air pollution has been with us a long time. Back in 1350, the English lopped a guy's head off for polluting the air. We have had air pollution since there have been cities. It got especially bad at the time of the industrial revolution. People were concentrated. The fuel they were burning was coal and wood, and the soot that was being emitted was dirty and low level, so that it had no chance to be diffused before it reached the ground.

In our era, we have many more people around and we are using much more fuel and energy so the potential for air pollution should be much greater than it was then. Thankfully, our technology has also been growing and I believe that I can see the day when we will be rid of this blight. One of the big reasons that we are able to gain on our air pollution problems is the availability of clean gas and electricity for heat and light.

We in the electric power industry, are finding that our customers are

demanding more and more electric power just due to pollution control requirements. All of the cities in Montana are adding new and greater sewage treatment facilities that require tremendous amounts of electric power. Anaconda, Waldorf, the refineries and all the major industries are adding to their electric demand for pollution control reasons. These demands must be met in order to reach a goal of a cleaner Montana.

We are here today to discuss the increased industrialization that we can see coming in Eastern Montana. This area of eastern Montana has been losing population since 1920. We can all now see the possibility of considerable population influx into the area due to the development of a coal mining industry. This industry is going to grow due to the much publicized energy shortage. The electric power industry can't keep up with the demand for electric power with nuclear plants only. They must use coal to fill the gap until the fast breeder reactor comes into commercial operation. In addition, sources of fossil fuels in this country are dwindling. Coal is going to have to be gasified to provide natural gas for cities and liquified to provide gasoline. The big controversy around our state right now is just how fast will this industrialization come upon us, and what will be its effect.

Let me speculate a bit on these questions from the point of view of someone in the electric power industry. First of all, the demands for electric growth in Montana must be met through the use of coal-fired generating plants until about the year 2040. By that time, the breeder reactor will have become a reality and nuclear power will have taken over. The first demonstration plant breeder reactor should be in service in about 1985. Breeder reactors will probably be available and more or less "de-bugged" by about 1995. So some time around the year 2000, I predict that the last coal-fired power plants will be built in Montana. The then existing plants will continue to operate, however, for another thirty or forty years. Our studies show that the electric load growth in the Montana Power service area will

require about three thousand MW of coal-fired generation by this time. We are now building two three hundred and fifty MW plants at Colstrip. Half of this capacity is to be used to supply power to Puget Sound Power and Light Company in the Seattle area. We also are making feasibility studies for supplying additional load in our area and to the west in the future. However, I do not believe that any power plants above the three thousand MW, which I mentioned, will be required due to loads outside of the Montana Power service area, except in the Pacific Northwest. The reason for this is that the utilities west of us are committing themselves to building nuclear units. For instance, Puget Sound Power and Light just recently announced that they intend to put a new eleven hundred MW nuclear plant in the Puget Sound area in 1982. Also Portland General Electric has announced that they will have their second nuclear unit by 1981, which will be located in eastern Oregon. So the generation that is now under construction at Colstrip and that which might become feasible in the future will be used to supply our loads and the Pacific Northwest for an interim period while nuclear power catches up. Ultimately, I believe that Montana Power will trade with its neighbors to the west so the net effect will be that the plants built at Colstrip will be supplying only the Montana Power service area.

There has been much discussion about the North Central Power Study. This study was to inventory the potential in eastern Montana and Wyoming for servicing the electric load requirements in the central part of the United States; Minnesota, Iowa, etc. I do not see this developing at this time. To date, I know of no plans where any eastern or central United States utility is planning to construct power plants in either Montana or Wyoming. At the present time, coal is being shipped from eastern Montana and Wyoming to the states of Minnesota, Wisconsin, Iowa and Colorado. Black Hills Power and Light will be partners in a plant to be

constructed near Gillette, Wyoming and there are plans for a power plant to be built in western Colorado which will use Wyoming coal. The output from these plants will be insignificant when compared with the quantities discussed in the North Central Power Study. The midwest utilities seem to be either building lignite or nuclear plants in their own area, or shipping Montana or Wyoming coal east to burn in plants in their area. To do otherwise requires a major transmission system which simply does not exist. It can't exist before the 1980's because of the lead time required for planning and construction. Since the fast breeder reactor should become a commercial reality by about 1995, these midwestern utilities will surely rely on nuclear power rather than pay the freight necessary to ship Montana and Wyoming coal. That's why I see the use of Montana coal for about the next fifty years to fill the gap until nuclear power can catch up both to the east and to the west of us.

I think coal gasification and liquefaction is another matter. There is a definite shortage of natural gas and oil in this country. Most predictions show that by 1985 we will have to be importing half of our oil from foreign sources. The price of oil and gas is going up, and this will make gasification and liquefaction plants an economic necessity. To give you an idea of size, Montana Power's own gas needs to the year 2000 would require one coal gasification plant. It will have to produce two hundred seventy thousand mcf per day. This plant would be about the same size and look like one of the Billings refineries. A few gasification and liquefaction plants may be proposed in the decade for eastern Montana, but they will probably serve primarly the purpose of pegging the price of gas. They can't materialize all at once though because there will be about ten years lead time between the initial proposal and actual operation of a plant.

What effect will all this have on the air pollution potential in eastern Montana? First of all, as I said, we are constructing two three hundred and fifty

MW generating plants at Colstrip, Montana at the present time. These plants will be equipped with scrubbers that will remove ninety-nine and one half per cent of the particulates or fly ash. Eastern Montana coal is low in sulfur content, but these scrubbers will also remove much of the sulfur dioxide that is generated. A scrubber of this type is also most effective in removing the little fluorides that might exist in either the particulate of gaseous form.

It appears that coal gasification plants should have a minimum effect on air pollution. There should not be any particulate emitted, and any SO2 which is generated should be made into elemental sulfur and removed as a marketable product.

Coal mining with proper land reclamation, that is with land reclamation following close begind the mining, should cause little dust problem in the area.

Now let me address myself just for a few moments, if I may, to the growth of technology in the air pollution control field in the electric power industry. In the 1950's, power plants were equipped with dust collectors that were eighty per cent efficient; that is, about twenty per cent of the fly ash went up the stack. In the 1960's there was a shift to electrostatic precipitators. These devices were about ninety-five per cent efficient so that five per cent of the ash went up the stack. Also, in the 1960's there was a shift to fuels with low sulfur content. That's why the market for eastern Montana coal developed in the Chicago area.

Now in the 1970's, utilities are going to scrubbers. These devices collect ash at an efficiency of ninety-nine and one half per cent, one half of one per cent of the ash goes up the stack. They also are capable of removing much of the sulfur and fluorides and other trace elements. As we look to the 1980's and 1990's, I think that we can see continued improvement in technology. For

instance, there is much research being done on fluidized bed furnaces which will absorb sulfur dioxide right in the furnace. Low btu coal gasification for electric power production, where the sulfur will come out with the ash in the bottom of the system, is being proposed. We certainly will have improved scrubber technology and fuel cells. Some geyser power sites will probably be developed. Big storage batteries for peaking will be developed. In the 1990's, I think I can see magnetohydrodynamics and high temperature topping turbines coming into play to improve the efficiency of electric power generation. And some time in the 1990's, fast breeder reactors will become commercially available to increase our available nuclear fuel by thirty-fold. Sometime after the year 2000, fusion power probably and some form of solar power will be developed. They should make available energy sources almost infinite.

With these things in the future, provided that we work hard toward them, there is every reason to believe that there will not be a long-term energy shortage and that we will be able to keep ahead of and diminish our air pollution problems.

HARRY MITCHELL,

DAIRY FARMER

FORMER MONTANA STATE SENATOR

I do indeed appreciate being here today because I think this is a very serious problem that Montana is facing. I should state, right in the beginning, that I am not an expert on the subject. I am just a concerned citizen, as most of you are. As Vic Reinemer mentioned in the last panel, I am a dairy farmer, and I again deny that I have anything to do with Ayreshire Coal Company. I was a state senator, in 1967, 1969, and 1971. Because of problems with the cows I decided not to run for re-election. So I'm back again being just a concerned citizen.

I think the reason I was chosen for this panel is because one of my concerns has been air pollution. On December 15, 1971, when the Board of Health was addressing itself to the problem of smelter air pollution, I made the following statement: "In my opinion, the request of the Anaconda Company at that time, goes much further than just smelters and SO_2. The real issue is the future control of fossil fuels and their effluent, whether based on ambient or emission criteria This is a critical matter for the future of Montana's air." That was several years ago, and I believe that I was the only one at the hearing to bring up the issue.

An article came out in Environmental Action Magazine entitled, "Clean Air, Dirty Politics." This is very interesting reading. The article is little better than two years old, but is pathetically a

forecast, I fear, of what we have to look forward to when President Nixon gets around to his special message on the energy problem.

Soon thereafter, I became a plaintiff in a suit against Mr. Ruckelshaus to enforce the air pollution standards that Montana had come up with. Perhaps most of you remember the problems the Board of Health had without the Governor's signature at that time. I thought I'd try to bring you up-to-date as to what has transpired in this case and then get into the potential for air pollution in Montana.

On September 17, 1971, the Anaconda Company filed a petition with the Board of Health requesting the Board to hold a re-hearing on the sulfur oxide regulations for primary non-ferrous smelters which require a ninety per cent emission reduction. The hearing was held on December 15, 1971 at Carroll College and it lasted some twelve hours. The main thrust of the Anaconda testimony was that the standards were too strict to be compiled with under available technology and that the company would suffer economic hardship if they were required to comply. The testimony offered by witnesses supporting the existing standards indicated that technology was available to the smelter industry and they were able to comply, and further, that such standards were required to protect human health, safety and welfare.

On January 7, the Board of Health unanimously ruled to deny the Anaconda petition, holding that, among other things, technology is available to the smelter industry to enable them to comply with the emission standards now required. The next day the Board held a

public hearing on the proposed implementation plan as required under the Federal Clean Air Act Amendments of 1970. This plan encompasses the emission standards debated in the previous 15th of December hearing. After the hearing the plan was revised and prepared for submission to the EPA. On the 28th of January, the plan was hand delivered to Governor Anderson, but he refused to sign it. The Board, however, adopted the plan on February 4, and submitted it to the EPA without the Governor's signature.

On February 14, EPA notified the Governor's office that the plan would not be accepted. On March 14 the Governor transmitted to EPA the Board's implementation plan with all references to sulfur oxides deleted (except for some references to commercial fuels). The EPA received and accepted the deficient plan on March 22. Two days prior to this, on the 20th, twelve concerned citizens of Montana, of which I was one, filed a notice of suit against the administrator of EPA, Mr. Ruckelshaus, under the citizen's suit provision of the Clean Air Act for his failure to accept the complete plan as submitted by the Board. In the complaint we stated that the federal statute required and authorized the state to adopt and submit a plan, and that in Montana, under the Montana Clean Air Act, the Board of Health is the agency vested with such responsibility. And now the issue is drawn. Which has the dominant position, a federal regulation written by unelected officials based upon a law passed by the federal government, or a state law that was put together by elected public officials in the State of Montana. A federal regulation versus state law. Of course, you have to go to court to find out.

On the 27th of July the EPA issued proposed regulations for the abatement of sulfur oxide. These standards provided a control strategy and limitations that were in effect, but not in origin, similar to the standards of the Board of Health. The federal standards, for example, came out with eighty-nine per cent, the state standards had it at ninety percent. There were other little differences, but as a result of this situation, we withdrew our suit "without prejudice," meaning that we could refile if we saw fit. We did this prior to the public hearing on the proposed federal standards.

After the EPA hearing, Anaconda filed a suit alleging that the hearings had been improperly conducted as the proposed emission limitations were based solely and entirely on a single twenty-four stack ambient air quality sample taken by the state on two different occasions. The complaint further alleged that the sulfur oxide emission limitation required emission reductions that were not possible under existing technology, the same position that they had taken before the Board of Health. On December 6, Judge Winter of the U.S. District Court in Colorado issued a verbal opinion holding that the company was entitled to an adjudicative hearing required by federal law. This stayed the implementation of the plan for Montana. The result of this decision is that Montana remains without any quality implementation plan as required by the Federal Clean Air Act. That's where we are today. Similar actions have been brought by other smelting companies in the smelting industry in other western states. That brings you up-to-date. What we must do now is try to determine whether we go back to the state program for the Governor's signature or whether we refile the suit.

Now I'll get into why some of us are so concerned about air pollution when it comes to the burning of fossil fuels, Mr. Labrie mentioned the North Central Power Study. I would like to discuss that briefly. And I would like to emphasize that it was a study, there is nothing sacred about it. In October, 1971, the Bureau of Reclamation released Phase I of the North Central Power Study which in essence pretty well details Montana's potential for polluted air. This study was launched on the 26th of May, 1970, by the Assistant Secretary of the Interior. Before the executives of the major power suppliers of North Central United States, he explained "the need for coordinated study to investigate the power needs and resources for the area through the year 2000." The vast supplies of coal and small demand for electricity in the area near the coal fields, (we're talking about the Fort Union Coal field), were considered likely to result in the states of Montana, Wyoming, North Dakota and Colorado, becoming energy exporters.

The basic idea was to investigate the feasibility of constructing large mine-mouth thermal plants located in the large coal field just east of the Rocky Mountains, and by the use of extra high voltag transmission lines to deliver electric power to the major load center Conclusions from the study indicate that development of the coal fiel of the North Central region is almost certain if projected future electric and other energy needs are to be met. We've heard a great deal about that this afternoon.

Now the maximum annual production that they came up with was fifty-three thousand megawatts over a thirty-year period. And to

give you some perspective of what that figure means, the first two Colstrip plants will be three hundred and fifty megawatts each; the Corette plant is one hundred and eighty megawatts. Should full development of the twenty-one proposed power sites in Montana occur, some sixty-nine thousand megawatts of electric energy would be produced annually. Most of these plants would range in size from one thousand to five thousand megawatts.

One of the serious problems associated with these plants is their air-borne emissions. Mr. Labrie talked about this earlier. Even with the best pollution control technology, large volumes of pollutants will still be given off. The emission of particulates, sulfur oxides, and nitrogen oxides can be expected. Now sulfur oxides in the air, according to what President Nixon said back in 1971 in his message to the House, "are among the most damaging air pollutants. High levels of sulfur oxides have been linked to increased instances of diseases such as bronchitus and lung cancer. In terms of damage to human health, vegetation and property, sulfur oxide emissions cost society billions of dollars annually." I have stacks of information to back this up. SO_2 is the issue, or was the issue, between the Governor and the Board of Health, and it's still the issue in the final implementation of Montana's air pollution law. Electric power plants generated over half of the estimated thirty two-million tons of sulfur oxides released into the atmosphere in 1970. This is the biggest single source for sulfur oxides, not the smelting industry. The report of the North Central Power Study states that the coal from the Gillett-Colstrip area may preclude the need for sulfur oxide removal because of its low sulfur content. This

was written in 1971. The management of the Four Corners plant near Farmington, New Mexico also claimed "that since the plant burns low sulfur coal, it creates no sulfur pollution problem." This plant, when operating at full capacity, can generate about thirteen hundred megawatts; small by comparison with those projected for Montana. Testimony given before the Senate Interior Committee in 1971 indicated that since the fully operating Four Corners plant burns about twenty-five thousand tons of coal each day, it spews into the atmosphere over one hundred thousand tons of sulfur dioxide, (equivalent about one hundred and fifty thousand tons of sulfuric acid) every year in spite of the low sulfur content of the coal and relatively low concentration of sulfur oxides in the flue gasses. When such quantities of pollutants are involved, it is quite apparent that quality air cannot be maintained by imposition of regulations based on concentration of flue gas or upon maximum emission allowed per unit of power of produced or fuel consumed. It is the total amount of pollutants released to the atmosphere that determines the degree of environmental degradation.

In 1969, when the astronauts were circling the globe getting ready for their Apollo trip, the only man-made activity that they could positively identify was the smoke plume from the Four Corners plant in New Mexico. That plant was producing about thirteen hundred megawatts. The North Central Power Study has programmed a maximum capacity (and this is programmed, it doesn't mean it will ever come about) of about sixty-nine thousand megawatts. Reduce that by half, or take only ten per cent of that, and we still have a tremendous

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pollution source destined for eastern Montana. I suggest to you that here in Montana we have a microcosm of the problem that's facing the world in terms of energy consumption. Somewhere this consumption has got to level off. Nothing can grow forever. And if we can't recognize this and do something about it in Montana, then I doubt if it's going to be able to be done anywhere.

BENJAMIN F. WAKE

ADMINISTRATOR, DIVISION OF ENVIRONMENTAL SCIENCES

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

I appreciate the opportunity to be here and hopefully to add something to what has already been said. I wish that I had some great and profound words for this occasion, but I suppose any person who speaks very much runs out of new things to say, and I have. So, if you've heard all that I've said before, then that's because it's all been said.

I believe that the extraction, burning and processing of coal in Montana to the extent described in many newspaper articles and public meetings over the past several months will, if not carefully planned for and developed, produce a devastation of land, air, and water already experienced in many other places in the country. To have such devastation occur "innocently", and I put quotation marks around that, as it perhaps once did is one thing, but to permit it to occur again when we know how to prevent it is unforgiveable.

There is no doubt that until such time as a zero emission of air pollution is a reality, (it's not here yet but it shouldn't be dismissed as unrealistic) we can certainly expect a deterioration of existing air quality in the coal regions of the state. I'd like to point out that we believe, and it's something that I think that Dr. Gordon would have perhaps spent a good deal of time on, that there is a need for a change in the standards. We developed these standards way back in 1967. With the rapidity of change and new information on the effects of certain materials and especially on the availability

of new control technolgoy, I think it's entirely appropriate that we review the whole gamut of our regulations and standards and upgrade them provided we can get the support that we'll need to be able to stand up in court, because I'm sure that we will be challenged there.

To minimize the deterioration, which I am certain will occur, it should be the policy of the state to require controls in keeping with the most advanced state of the art, which is contrary to the EPA position. Even then, when such state of the art is fully utilized, if ambient air quality standards are likely to be exceeded, the proposed development must not be allowed to proceed. Now if you think on that, it's a pretty stiff statement. I don't know whether you want to live with that or not. And it will become a matter of national policy when we reach the point at which we determine whether we're going to live that way or not.

I call your attention again to the word "minimize". I don't know that we can have such a thing as a non-degradation principle if we follow it absolutely to the letter, because that means no more of anything beyond what is already there. I don't think that we could live with that. It is quite possible that if there is not a constant and significant improvement in control technology, that the vast coal development visualized by some may not be able to take place. It is expected, however, that if the policy previously mentioned is firmly adhered to, there will be advancement in control procedures sufficient to permit the orderly development of Montana's coal resources and would be in keeping with the national interest.

I propose again, as a digression from this story, that we go a step at a time. To me, the fifty-three thousand megawatts that

Mr. Mitchell has mentioned, may just be pie in the sky. I don't know whether this can come about or not. We have advised the Montana Power Company, as an example, that not one shovel-full of dirt will be turned on any plant (subsequent to the one on which the foundations have now been constructed), until such time as the existing plant is evaluated to determine the effectiveness of the control procedures. I think this is compatible and necessary as part of our administrative prerogative to be able to do this, and it is not contrary to our position that we have held in allowing them to go ahead with the foundations at this time - at least not in our opinion.

I see no way that we in Montana can or should perpetuate an existence to the exclusion of our sister states. What this says as I have heard some people say, is that this is our coal and if we don't want to mine it, we're not going to mine it and if we're going to send it out to somebody else then let them bear the cost of it. But we cannot bottle up people in the cities on the coast anymore than we could have bottled up our forefathers who came here from Poland and Germany or Czechoslovakia or Russia or where ever it may be, who came to this country to keep from being bottled up someplace else. People are going to come to Montana for various reasons, and they need a place to work, they need a place to live, and I don't think there's anyway that we can prevent that. I don't even think we should.

This does not mean, however, that Montana should become a dumping ground for crude technology, or inferior emission controls or reclamation proceedures, simply because people in other states need electricity, or gas, or simply because we in Montana are not yet as dirty as they are. I think that the effect of the Environmental Protection

Agency's policy will be to make us as dirty as they are. It is the natural effect of an ambient air quality standard approach, and although I must admit that's not all that they are doing, if that's the primary element with which they manage their program, we're going to have serious problems maintaining or minimizing or resisting degradation in the cleaner areas.

I believe that there is no way to avoid development of coal resources and I expect attempts, although I don't think they're as great as they were, to avoid proper control procedures if we're not critically watchful. But while there is no way to avoid development, there is no reason to accept degradation as a natural companion of such development. Among the two hundred people here, of course, we might have two hundred different difinitions of what degradation means. We (state authorities) felt, in the beginning, when things began to really roll in eastern Montana, that there would be a gold rush syndrome that we simply wouldn't be able to contain. I frankly have no doubt about our ability to take care of the air pollution control situation. I hope and expect that the Legislature this session will construct suitable reclamation procedures for land and other things that may be necessary.

But, while we were concerned about this gold rush syndrome, which was characterized by hasty judgements and numbing of the normal spirit of compassion and concern for each other and the land, there has now developed a "lock-out or lock-up" situation that I think is equally unrealistic and is unfair to the rest of our fellow citizens throughout the nation. I'm quite certain we can make this thing work and I would like to suggest what I have suggested before with regard to

what I think State policy on air pollution control should be. Number one: that ambient air quality standards should not be exceeded. At those locations where such standards are exceeded, the offending pollutant or pollutants shall be reduced to, or less than (and this "less than" thing is important because that's what we're being challenged on by the smelter), the ambient air quality standards by installation and operation of the best control technology available. No control system less effective than the most effective available shall be permitted. And number two: that existing air quality shall be preserved. Where existing air quality is found to be better than the ambient air quality standards, it shall be protected and maintaine by the application of control procedures in keeping with the most advanced state of the art, except that the air quality may be degraded up to (but certainly resisted in all instances), but not beyond the ambient air quality standards if controls in keeping with the most advanced state of the art are installed and operated by the emitter. If it is predicted or if it develops that an additional system will cause or is causing the ambient air quality standard to be exceeded even when the best control technology is to be applied and operated, the emission shall not be permitted.

FRED WETZSTOEN

RANCHER, (SULA, MONTAN)

CHAIRMAN, NATURAL RESOURCES COMMITTEE, MONTANA FARM BUREAU

I suppose that, like me, my friends out there are wondering what I am doing here. The Executive Director of Montana State Farm Bureau generously volunteered for me, knowing well that my ego and a certain dedication would not allow me to refuse. I am, therefore, to a certain extent circumscribed by Farm Bureau policy, which simply stated says that we oppose the production of electric energy by coal burning electric systems within Montana beyond the needs of Montana; that coal rather than electric energy should be our export and that mined areas should be restored, preferably to their full agricultural potential.

I am convinced, in my own mind, that available knowledge, experience and dedication to responsibility are sufficient to insure that coal burning systems will not be constructed that will be harmful to Montana environment, and that improvements that show up will be incorporated as construction progresses.

What was luxury day before yesterday, was convenience yesterday, and is necessity today. We have built our lives around electric energy. Our existence as farmers and ranchers and our ability to produce necessary food and fibre is today dependent to a very great extent on electrical energy. We have built our lives around electrical and other mechanized devices, partly because of convenience but mostly because of necessity.

We are rapidly depleting, throughout the world, non-renewable natural resources that can and will be substituted for by renewable resources that will be produced on our lands. Great amounts of electrical energy will be needed to convert these resources to products usable by man and it is our responsibility to

[illegible] means of creating new electrical energy.

[illegible] a few years ago, power companies and other utilities were almost [illegible] because of the public outcry of an economic theory which was [illegible] in order to stay in business and in the process had to be a recipient of [illegible] tax dollars for many billions. Recently, a builder whose imagination and [illegible] has taken over and proven, I think, that the way to success is to be [illegible] to be ahead of public demand. "Overbuilding" along with conservation, [illegible], and similar classifications have moved us away from [illegible] systems, and real prosperity is the other boom sensible, safe and [illegible] place to go.

I have no patience with those who suggest that we are in serious trouble [illegible] on our use of electricity. I see no reason why we should. We [illegible] needs and desires should be met insofar as it is possible to do so, and the [illegible] necessary needs and desires of our society should be supplanted by such [illegible] use, storage and creativity. I believe we should continue on our course [illegible] to our economy with low-level energy production plants and if our import [illegible] are reduced in that way, we'll borrow "gas to go" because there are [illegible] plenty of "on the ground" here at home and with [illegible]. It is unfortunate that [illegible] is presently in the process of [illegible] years behind the times.

We believe in gas, we believe in gas, we've got it. I am [illegible] the old words about [illegible] I had to learn a [illegible] that is not [illegible] weather. The Mayor runs on gas energy, the Governor runs [illegible] the rest of the people. My son-in-law and I [illegible] of [illegible] through a heavily [illegible] region in less than twenty days to see him [illegible] to my mind. We have built our lives around electric energy and that [illegible] appeared during our 60 cycle time [illegible] by [illegible] I would suggest an [illegible] supply of electrical energy [illegible]

of good judgment in relation to those other so important resources, air and water.

And finally, I cannot be convinced that any utility is going to spend millions to construct an energy-producing plant that is going to be closed down by environmental considerations before it can get into production. I believe that knowledge and sincerity is sufficient, and that a moratorium in the coal fields could be likened to a moratorium on a six-months pregnant mother because someone has determined that doctors do not know all there is to know about childbirth.

III

COAL, ENERGY, AND MONTANA WATER

RICK APPLEGATE

RESEARCH ASSOCIATE, MONTANA ENVIRONMENTAL QUALITY COUNCIL

I am a research associate with the Montana Environmental Quality Council but I will be speaking only for myself today. My opinions do not necessarily represent those of the members of the Environmental Quality Council or its staff. I approach the subject of coal and water, indeed, of coal-energy development in general, with substantial misgivings. A quick glance at the recently issued Coal Task Force Report yields numerous statements such as, "Evidence is fragmentary and inconclusive and the fact remains that we know very little. We have continually encountered unknowns or unmeasurables." Another, "Whenever possible, irreversible resource decisions of significant magnitude should be postponed until the information gap can be narrowed. Trade-offs are difficult and we lack adequate understanding and agreement on the specifics and magnitude of our potential resource and human problems.", and so on throughout the report. With this number of expressed doubts encountered, one is uncertain precisely how to get a handle on the impending coal development, and specifically how to assess its effects on water resources and water quality in the state.

There are, however, ominous prospects. First, massive and continuous, not seasonal, consumption of water from the Yellowstone River would seriously affect agricultural, fisheries, tourist, recreational and esthetic uses of water. Second, the central role water plays in various coal development technologies suggests that it may be the crucial variable in thermal electric generation, MHD conversion to electricity, gasification, liquifaction, or slurry pipeline transportation. Third, there will be increased water demands resulting from uncertain increases in population in southeast Montana. Fourth, the unknown plans of energy development companies for development of alternative technologies yields very different water demands,

whether we're talking about thermal electric generation as opposed to gasification, or wet as opposed to dry cooling. Fifth, the possibility of coal companies buying up irrigated lands to acquire water rights, and many more.

Again quoting from the Coal Task Force, "Until more is known as to likely timing and magnitude of these demands, the resulting effects on physical, natural and human systems can only be speculated upon." Needless to say, these doubts and prospects leave one unsettled in the face of potentially enormous disruption of the aqatic ecosystem of eastern Montana.

There are, however, important and encouraging provisions in coal related measures before this session of the Legislature, and they have a direct bearing on development of coal as it affects water resources and quality. I'd like to touch briefly on those and then discuss the decisive limitations that I think they have; a limitation that makes one of the other measures before the Legislature most appealing to me.

Two of the reclamation bills contain provisions requiring surface owner consent for any permanent water impoundment. Three others have provisions permitting recovery for damage to ground water or surface water contamination. Three of the bills have detailed provisos for selective denial, the language of which evidence a regard for the quality of surface and ground water. Since the water quality impacts of stripping itself are quite direct, these provisions need careful attention, and when enacted, vigorous implementation. The Montana Scenic Rivers Act is an effort to complement the developed rivers of the state with a policy that would preserve certain waters in their free-flowing, natural and scenic condition. The inclusion of the Yellowstone as the scenic and recreational river amounts to a policy decision that further diversions of its main course are prohibited. This is an especially encouraging step given the on and off plans for the construction of the Allenspur Dam near Livingston, flooding the beautiful and

highly productive Paradise Valley. Of course, if there is to be no massive energy development as we've heard continually since the uproar over the North Central Power Study and Aquaduct Study, then there should be no opposition to the scenic rivers designation from energy development quarters.

One of the most important measures ever considered by a Montana Legislature is the Utility Siting Act. This measure, as drafted, is compelling in that it requires a certificate of environmental compatibility and public necessity before a proposed facility gets even a tentative green light. Throughout the bill is spread a series of constructive presumptions against facility siting. These effectively allocate the burden of proof to the applicant, requiring him to make affirmative showing that the facility is needed, not just "demanded." A host of water related factors would receive consideration in the siting decision. Effects on natural systems, recreation opportunities, adequacy of water supply, impacts on ground water and stream flow, and so on. The mere fact that each of the above measures was introduced in this session is an encouraging sign both that the Legislature is coming to grips with the unyielding difficulties of an appropriate coal and energy development, and that the considerations of water quality are assuming a justly central position. Any number of provisions in the bills deserve and demand support and the bills themselves need to be enacted.

However, I believe there is a limitation to the measures, and it is upon this limitation that I would like to reflect for the remainder of my time. I do not believe that we have as yet squarely faced the crucial first question of coal and energy development. This question is not merely a question of procedure, but one of substance. It is not "How and to what extent do we reclaim?", not, "What are the standards for facility siting?", etc.; rather it is, "Should we expand the current level of development at all, and if so, how much?" The most important coal related measure before the Legislature gives us the time to consider this substan-

tive question, to stop the head-long rush to develop in response to a poorly understood energy crisis, and to chart a rational course after we assess all available alternatives.

House Bill four hundred ninety two goes beyond the other bills that I've mentioned in that it provides a healthy delay of further energy development while specified state agencies carry out a coordinated, comprehensive study of coal related issues. The studies would be reported to the 1976 session of the Legislature. By that time, the Legislature should also have before it a Department of Interior study of Northern Great Plains resources and an energy policy study from the Environmental Quality Council. The State Department of Health and Environmental Sciences would report on potential surface and ground water pollution and diminution, including recommendations to prevent significant degradation of water quality. The Bureau of Mines would study effects on aquafers and recharge areas; these are especially critical for operations near Decker. The Departments of Natural Resources and Fish and Game would study surface and underground hydrology with recommendations to prevent depletion of water resources to the detriment of agricultural and recreational uses. This would give the Department of Natural Resources additional time to rectify short-comings in the state water plan and the Water Resources Act and to require federal, local and private planners to cooperate further with the state.

My support for the moratorium is not at all to suggest that the reclamation, siting and scenic waterways bills are at all unimportant. Certainly they're essential to control existing operations and those currently under construction. There are further questions, however, and as the Coal Task Force Report states, "It does not require any specialized training to realize that the natural environment and the present quality of life within the region stand to suffer potentially great adverse impact." This says to me that the only approach is one of caution, supplemented by detailed steady handed study of all relevent problems. Should we fail to spend

the time which a moratorium will provide to determine the numerous unresolved questions of coal development, we will be guilty of what economists sometimes refer to as sub-optimization. In this case, there will be a panic-stricken rush to determine the best way to do something, which perhaps ought not to be done at all.

TED DONEY

DEPUTY DIRECTOR

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

I am the Deputy Director of Natural Resources and Conservation and also the legal counsel for the Department. Before I make a few remarks on water, I'd like to announce that the Department has recently published the coal situation report. It was compiled by the Coal Task Force and most of you probably know about this publication, but it is available, if you want it, from our Department in the Mitchell Building. It is probably the most comprehensive overview of the entire coal problem existing in Montana today.

Like Rick Applegate, I too have misgivings about the water problem as it's related to coal development. I believe that water is the key to coal development. Without water, development is not going to take place. Not so much because of the related problems of reclamation and those things, but because of the law. What I'd like to do is discuss today a little bit about the existing water law in Montana and the kind of problems it creates in the coal development area. Then I'd like to say a little bit about the recommendations for change which our Department is proposing.

To begin with, the coal development in eastern Montana is going to demand huge quantities of water. Nobody knows for sure how much it will be. We have only estimates up to this point, but the North Central Power Study, for instance, predicts that approximately two point six million acre feet of water per year will be needed if all the coal development projected in that study takes place. That projection is perhaps somewhat exaggerated, but it would amount to approximately one-third of the average annual flow of the Yellowstone River. In a low year, it could even be up to eighty or eighty one per cent of the average flow. Montana Power is currently constructing a seven hundred megawatt plant at Colstrip. According to their

own comments in the environmental impact statement put out by the Department of Health and Environmental Sciences, that plant will use approximately thirteen thousand acre feet of water per year. At the same time, however, Montana Power has filed a notice of appropriation for two hundred fifty cubic feet per second, or one hundred fifty-eight thousand acre feet of water per year. This shows the magnitude of the kind of water development we're talking about, and that's just for one plant. Some of these gasification plants could perhaps use quantities of up to thirty thousand acre feet of water per year.

The existing law in Montana is probably one of the most archaic and useless water laws in the United States. We have what is known as the "appropriation doctrine": first in time is first in right. The essential features of this water doctrine are that a person who gets there first has a prior right. When he diverts the water and puts it to a beneficial use, he then acquires a right for the amount of water that he put to a beneficial use. Most of the western states have this type of doctrine. In Montana there are essentially two ways that you can appropriate water. The first is to file a notice of appropriation at the point where you're going to divert the water. That notice has to contain certain information such as your name, the amount of water you're going to use, etc. Within twenty days of that you have to file a similar notice with the County Clerk and Recorder in the County wherein the point of diversion takes place. The law goes on to say that within forty days after you've filed the original notice at the point of diversion, the appropriator must proceed to prosecute the

excavation or construction with reasonable diligence. What this means is not really clear. Court cases have decided over the years that each case depended on its own facts. But in a situation like the coal development, if the power plant needs water and it files a notice of appropriation, perhaps it will take five or ten years to construct the facility with reasonable diligence. If the person files the statuatory procedure, the advantage of doing that is that his priority date relates back to the time that he filed his notice.

The second way you appropriate water in Montana is just to go out and use it. You go out to the stream, divert the water, put it to a beneficial use, and at that time you acquire a valid water right in Montana. With this method you don't get to relate your priority date back to the time when you filed the notice because you didn't file any notice. Your date of priority is the time that you actually put the water to a beneficial use. Now as part of this appropriation doctrine, you cannot interfere with somebody elses prior right. So if you go upstream and appropriate water and adversely affect somebody else downstream that has a prior right, then legally you cannot appropriate that water. But in most cases, the only way you can stop it is for the person downstream to take the upstream appropriator to court.

So, the system we have in Montana is, as I said, probably one of the most archaic in the nation because we have these use rights with no filing. Even the people that do file a notice of appropriation exaggerate their filing. For instance, on the Big Hole River, with an average annual flow of a thousand cubic feet per second, there

are filings of two hundred thousand cubic feet per second. A lot of people don't file. In the Fort Union region, our Department has about eight thousand filings, but we estimate there are at least twelve thousand water rights in that area. There's no way that anybody can tell you with any degree of certainty in Montana who has a water right or how much water he's using.

To compound the problem in the Yellowstone River area, Montana is a signatory state to what is known as the Yellowstone Compact. That is a compact between Montana, Wyoming and North Dakota to divide up the water of the Yellowstone Basin on a percentage basis. For example, on the Tongue River at the point of measurement, Montana is entitled to sixty per cent of the water and Wyoming is entitled to forty per cent. And it's the same on the other three tributaries, the Clarks Fork, the Big Horn and the Powder. But because of Montana's existing law, we have no record, to speak of, of who's got water rights So, when we're in competition with Wyoming and dividing up the water, we can't prove what water we're already using. This just compounds the problem. The Yellowstone compact does require that everybody in the Yellowstone Basin who is going to appropriate water must file a notice of appropriation with our department. But people don't do that. As far as I know we've received about seventeen of them in the last twenty years. There's no statement in the law that if a person doesn't file then he doesn't have a water right. The only statement is that it's a crime not to follow the law. Of course, if we were going to try and enforce this law, we would have to go to court in every situation and charge the person with a misdemeanor. So the Yellowstone Compact, even though it does require filings, is pretty

ineffective too.

In the coal area, the main problem that I see is that nobody can answer with any degree of certainty what effect the use of water for power plants is going to have on existing rights. The reason for this is that nobody knows what the existing rights are. Even on streams that are adjudicated, existing rights are very uncertain. People can keep going into court and appropriating more water and dragging everybody else into the adjudication. In addition, we have the problem of federal water rights. I'm sure that Mr. Gibbs will have something to say on that. The federal government has superior power to the state, in some cases, for appropriations of water, but the quantity of the water that the federal government is entitled to is, up to this point undecided. In addition, we have the Indian water rights. Under the Winter's case, originating in Montana, the Indians are entitled to water for use on their reservations for irrigation purposes, or perhaps other purposes. So all this compounds the problem of coal development and nobody knows for sure exactly who has what water rights.

What our Department is proposing to do is completely revamp the existing water law in Montana. Most of you have already heard about this. We are proposing to initiate what is known as the permit system All the other seventeen western states have this system with the exception of Colorado, and they have it for ground water. What it would do essentially is require people to come into our department and apply for and receive a permit in advance before they can appropriate water There would be certain criteria written into the law on when permits will be issued, and for the first time in the history of our state

the public will have a say on who's going to use water and for what purpose. If a person applies for a permit, and our department determines that the granting of that permit would adversely affect someone elses water right, then we deny the permit or reduce the permit. Under the existing system all they have to do is go out and start using water, and if somebody's affected then they have to take them to court.

The bill that's introduced now is Senate Bill four hundred forty-four. It will be amended to some extent in committee. I think that this new water law is absolutely essential if we're going to get a handle on the water rights situation in the coal development area.

PHIL GIBBS
REGIONAL PLANNING ENGINEER
U.S. BUREAU OF RECLAMATION

Montana is fundamentally an agricultural state and the Yellowstone River Basin is also basically agricultural. The Bureau of Reclamation has helped the area become that way by its four projects stretching between Huntley and Sidney. In the whole Yellowstone Basin, there are about one million two hundred thousand acres of irrigation farming. Of this acreage, the Bureau has constructed the facilities for about one-fourth. We have built four large reservoirs, two small ones, and four powerplants. This background is to make the point that irrigation in Montana needs to be further developed whenever possible.

At this particular time in our history though, we are rapidly discovering that many people no longer believe in dams, new water supplies, or further irrigation. This puts Montana into an awkward position because the state still has dry lands that should be watered, and it has the water to do the job. In fact, Montana really has a lot of water beyond what it can ever put to use through agriculture.

There can be but little change in water use on most dry farms and grasslands by increases in stockponds, development of springs, and minor groundwater pumping for livestock and domestic use. Such activities will not noticeably affect surface runoff or streamflow.

Opportunities to use much more of the Yellowstone Basin water supplies for agriculture are limited to conversion of some of the valley dry land to irrigated land, but right now there are obstacles to doing

even that. There are several problems, but the main one is that irrigable soils are limited, the benches which need water lie too high above the rivers, and the anticipated interest rates make expenditures for delivery systems hard to justify economically. Our opinion is that future changes toward irrigation farming will be very limited in the Yellowstone River Basin. We do expect municipal water supplies to increase to accommodate the growing population, but it doesn't take much water to serve a lot of people. The Yellowstone River now averages about eight point eight million acre feet per year where it leaves Montana. If we can see only the need for one or two hundred thousand acre feet to use for future agriculture what shall be done with the rest of the water? The only remaining choices are recreation development, mineral development, or continued loss of the resource. The more than eight million acre feet annually leaving the basin belongs to Montana and Wyoming. One question arises as to why these two states would want to sit by and watch it flow away to other downstream states. If they do, the only answer can be that they don't understand the value of water.

From the many contacts our Bureau has had, we have the opinion that Wyoming has a strong desire to use its share of the water but that Montana is unaware of the potential that wise water development can bring. Ordinarily, two adjacent states could have diverse viewpoints without too much difficulty, however, trying to achieve their individual objectives when those objectives are completely opposite causes great difficulty and defeats the usual advantages of cooperation and harmony. The problem, in this case regarding future water use, is present because of some of the provisions in the Yellowstone

River Compact.

The Compact was agreed upon and ratified by Wyoming, Montana and North Dakota back in 1951 and has been in effect ever since. What the Compact intended is a division of the surplus waters of the four principal tributaries to the Yellowstone River. These are the Clarks Fork, the Bighorn, the Tongue and the Powder Rivers. All four rivers flow from Wyoming into Montana and the surplus waters we are talking about are most of the eight million acre feet now being wasted. Further, in a dry year, Wyoming is entitled to even more water than Montana.

The Bureau of Reclamation has only one purpose: We are obligated to assist the seventeen western states in developing their land and water resources. If Montana wants to give up its future development, we will still be obliged to do what we can for Wyoming and the other states.

We thought we had a good study of development possibilities at several levels. We studied the water resources of each state and their potential for further development. We found, for instance, that the states of Wyoming and Montana could pre-empt enough water to develop the irrigable lands of the Indians, supply a full water supply to all the lands now irrigated, develop a supply of water for all the potential irrigation projects which look economically feasible and still find as much as three million acre feet which could be used for the gasification or conversion of coal which both states have in large supply. Furthermore, this study left most of the water in hte Yellowstone River as far downstream as Miles City under all alternatives. Our studies also show that all this could be accompanied by

using only one-third of the total flow in average years and one-half of the flow in the driest year on record. Even the minimum flow provided in our studies would be higher than the minimum flow that nature dealt us under existing conditions. Large diversions from the river at Miles City would accomplish several things: it would permit the states to share the water which the Compact intended, it would be the cheapest source of major water supplies for the Gillette area, it would reach many of the coal fields in Montana, it would minimize the number of aqueducts required to develop the coal resources, and it could fit in satisfactorily with plans for the Yellowstone Scenic or Recreation River.

Wyoming thought our plan was good, and most of the companies which indicate interest in coal also seemed to like it. Only Montana appears skeptical or prone to argue the results. Of course, the state can establish whatever legal policies and objectives it wants to, but if Wyoming wants to take its share of the Yellowstone River Basin water resource, and if Montana doesn't want to cooperate and make it reasonable for Wyoming to obtain its share, then the upstream state could withdraw its water before it enters Montana and such a course of action could disrupt the stream-flow regimen much more than a properly planned joint effort would. For instance, if Wyoming should extract eighty per cent of the Bighorn River flow, the percentage they are entitled to, what do you suppose would happen to the excellent fishery that now exists between Yellowtail Dam and Hardin?

In general, a cooperative attitude between states involving water development has always seemed to be the better course. So, to sum up, I suggest to the State of Montana and to you citizens here

today, that everyone will be better off with a good plan than with the piece-meal development that you can see beginning now throughout southeastern Montana and northeastern Wyoming.

TERRY MURPHY

FARMER (CALDWELL, MONTANA)

MEMBER, BOARD OF DIRECTORS, MONTANA FARMER'S UNION

The present and future development of coal mining and related activities may well herald the most profound changes, politically, sociologically and economically, that Montana has ever seen. Land will be involved. Water will be involved. And most importantly, people will be involved. As a farmer, I am interested in how this may affect my business. As a director of Montana Farmer's Union, I work in behalf of all family agriculturalists in the state and am concerned for the well-being of the agricultural industry and the well-being of every one of those individual farmers who make up the backbone of this state.

Any development in Montana which disturbs the land surface or changes the use of that land surface should be evaluated ahead of time as to its likely effect on agriculture. Any development which has a significant effect on both land surface and water should be doubly scrutinized before proceeding.

Let us carefully consider the role of agriculture in Montana. We produce about seven hundred million dollars every year. This is new wealth and the production will recur next year and the next, on and on; all from the same land. Agriculture is by far the largest dollar producing business in Montana and the fact that we deal exclusively in renewable resources should not be overlooked. Agriculture has been, is, and will continue to be the economic and social foundation of Montana regardless of other developments.

Exploitative industries may look real attractive on the short-term economic scene, but they come and go, and they can go just as quickly as they come. Agriculture will always be here, quietly producing those things we all need. That is, it will always be here if it isn't dug, blown, dried, or polluted out of business.

As vital as agriculture is to Montana, just so vital is water to agriculture. Clean water from underground sources is a must for livestock operations, to say nothing of domestic use. Already we know that in some of the strip mines, water is draining into the pits and being pumped out into streams which eventually enter the Yellowstone. Any contaminants it picks up are pumped along with it. Water tables may also be lowered, destroying stock water supplies or requiring deeper drilling. Who is responsible? Who will pay for deeper drilling for a farmer who may be located some distance from the actual mining operation? Who will replace the water from a destroyed underground supply? For that matter, who can replace it?

The waters of the Yellowstone and its tributaries are used on twenty-three per cent of Montana's total irrigated acreage of cash crops. With sufficient water, the Yellowstone basin will bloom and produce abundantly -- from now on, if need be. Without sufficient water, the economy of the area will suffer sharp reverses. With amounts of water from eight hundred thousand up to two point six million acre per year being claimed or talked about for future generating facilities who has first claim on the water? When the river gets so low at Sidney that water can't be channeled into the canals, who will do without, the power companies or the farmers' crops? Will the water diverted from the Yellowstone preclude any future agricultural appropriations? I don't know and if the coal companies know, they aren't telling.

The strip-mining boom is being touted in some circles as a boon to Montana. Skyrocketing employment, large amounts of taxes for our schools, power for a power hungry nation; all these may be good in a given set of circumstances. But, are we in those circumstances? We don't know, but I think we have reason to doubt it!

What about the belching smokestacks clouding the sky? What about sewage facilities for all the new people brought in? Estimates range up to half a million or more. What about waste water from the mining and generating facilities? Will it be clean or polluted? Farmers currently pay over forty million dollars annually in property taxes in this state! How much will the coal miners pay?

You know, an acre of irrigated farmland produces its wealth every year. An acre mined of its coal will never produce coal again. The farmland needs only care, which the farmer provides, and good, clean water, which we have in this state. Coal mining and power generating use up and dirty that water. No matter how conscientiously they try, a certain amount of pollution will occur. I ask, you, is the short-term economic boost of coal mining equal to or greater than the potential long-term loss to agriculture? Is it worth it to disrupt significant segments of our largest industry?

One other clean, renewable, and steadily growing industry in Montana is tourism. Why do tourists come here, spend money, leave and hope to return again? Do they come to see barren pits, dry or dirty streams, and a sky brown or gray from thermal generators? I think it's more likely that they come for the abundant clean water we have presently, for the fish which thrive therein, for the clear sky which they can see through for distances unheard of where most of them come from, for the air that they can breathe without the stench of sulfur burning their nostrils, or the grit of ashes settling in their lungs. They can get all that in industrialized "advanced" areas they come from. Perhaps they enjoy the quiet pastoral scenes of eastern Montana, where they can just rest their jangled nerves in an area which doesn't overwhelm and dull the senses with racket. Come to think of it, I kind of like those things too. Maybe we should try to hang onto some of them!

Water! That's the key to all of our clean, renewable resources. Take two point six million acre feet per year out of the Yellowstone and you have taken thirty-two and a half per cent of the total average flow. However, the historic low flows of 1934 and 1961 of four point two million acre feet, if repeated would mean that almost sixty-two per cent of the total flow would have to be used to keep the generators turning. How much does this leave for agriculture and recreation?

In the absence of answers to these questions, we of Montana Farmer's Union request our representatives and senators to declare a moratorium on all new starts of both extractive and conversion facilities. The moratorium we request should be in effect for not less than three years and hopefully by observing those operations now in progress we can learn some of the answers and get a sense of direction. There will be no second chance. We must do it right the first time. To fail could mean a desert Appalachia in eastern Montana. We don't want it! We can't afford it! We must not tolerate it!

JAMES A. POSEWITZ

MONTANA DEPARTMENT OF FISH AND GAME

The area of eastern Montana subject to coal development is at this time not generously endowed with an abundant fishery resource. The fishery that does exist is delicate and tenuous; consequently it is vulnerable and extremely sensitive to water discharge changes resulting from new or changed uses of water. It depends, in part at least, on the eight point eight million acre feet previously referred to as being wasted down the Yellowstone River. It is also true that the impact of industrial water demands will extend to the most remote reaches of river systems flowing through or near the coal fields.

Consequently, the Montana Department of Fish and Game has two general areas of concern. One, impact on the fishery resource on or adjacent to the coal fields and two, impact on remote areas of the watershed expected to supply industrial water.

Before discussing these two general areas, perhaps we must briefly touch on the point of the value or worth of Montana's fishery resource. For many years now, resource managers and others have been going through all kinds of mental gymnastics trying to place a dollar value on a fish or a day's recreation. For an equal period of time, we have argued against placing such a value on the fishery resource even though some of the total dollar figures recently generated have been impressive. It has been our position that we are not simply running a fish market or amusement park.

The fishery resource of Montana does more than simply occupy idle hours and occasionally put something in the skillet. It is one of the best environmental indicators we have to indicate the net effect of man's activities throughout the entire watershed. If there is some environmental sinning going on anywhere in a watershed, you can be reasonably sure that it will eventually be reflected in the aquatic community. The only question is, are we sophisticated enough to detect

and trace changes in the aquatic ecosystem to their proper cause.

Fortunately for those who must monitor eastern Montana's aquatic resources, the changes resulting from the developing coal industry will not be subtle. Given this philosophy, fish populations of eastern Montana's streams must be viewed in an entirely different perspective, and we feel this is how it must be, for when one struggles to preserve the integrity and stability of a natural community, we are talking about more than "X" pounds of fish flesh.

Returning to our areas of general concern, the impact on the fishery resource on or adjacent to the coal fields, and impact on remote areas, let us now look briefly at the first.

Perhaps the most vulnerable areas are the Tongue River and portions of the lower Yellowstone itself. Contrary to popular opinion, the Tongue River supports an interesting and varied fish population including self-sustaining populations of small-mouth bass, walleye, sauger, ling, catfish and the only population of rock bass in Montana. Although the aquatic ecosystem of this river has not been well studied to date, it is obviously a very diverse and complex system. It is also sustained by water flows that frequently reach low levels under present use conditions.

The lower Yellowstone, while significantly larger, is equally complex. Both these systems are vulnerable due to industrial water demands that will invariably reduce flows. Reduction in flows in addition to the obvious problem of reducing available habitat also affect the river's ability to assimilate and transport pollutants presently being discharged into the Yellowstone. These pollutants include dissolved solids and waters of high temperature along with the more commonly recognized pollutants of municipal and industrial wastes. The effects of these concentrations of pollutants will begin deteriorating fish populations and other aquatic communities long before total water depletion is evident.

Rather than tempering consumptive water demands, now while we have time, we are likely to be subjected to a variety of programs to control or augment seasonal flows when they begin demonstrating severe shortages. Some plans may have merit and some may not, but in the program to augment and transport water, the impact of coal development will reach a long way from the coal fields. This brings us to our second area of concern, namely the impacts on water supply areas. These impacts can vary from such features as Allenspur Dam to offstream storage sites near the coal fields. Each alternative has its unique set of problems. Precisely what projects we will have to deal with depends upon the degree of control the state is able to attain. At the present time, the state has very little control.

Plant siting is currently an industrial option. Critical plant design features are also at present an industrial option. Both the point and quantity of withdrawal are subject to Montana's present water law which has a number of drawbacks. Urban development projected to accompany coal development is quite likely to sprawl over the Yellowstone River floodplain just as urban developers have encroached on other Montana floodplains.

All of these activities are now beginning to occur without planning and without control. Eventually normal fluctuations in the hydrological cycle will throw the natural system into a severe period of shortage, at which time we will be expected to solve our problems by a massive water control project, and at that time, mistakes we are making today will lead to increased pressure from the public to solve the problems we are now creating.

It is these periods of shortage to which we must all presently direct our attention. Fish populations, like all animal populations, are regulated by the carrying capacity of their aquatic habitat. Somewhere among a fish's needs on a given day, some important ingredient necessary to his survival runs out and that ingredient becomes his limiting factor. These limiting factors are usually the

extremes, not the averages.

While much talk on water use deals with average flows and annual discharges, impact on the natural systems must be approached from periods of extreme flows, either high or low. In relation to water needs, the aquatic community is not the product of the "average annual" anything. It is the result of annual extreme, whether it be low flow, high salinity, or maximum temperature. Montana's ability to control these extremes rests in our ability to control not only plant siting but also critical design features of plant construction and operation.

IV

COAL, ENERGY, AND MONTANA

LAND - SURFACE MINING AND RECLAMATION

ROBERT R. CURRY

ASSOCIATE PROFESSOR

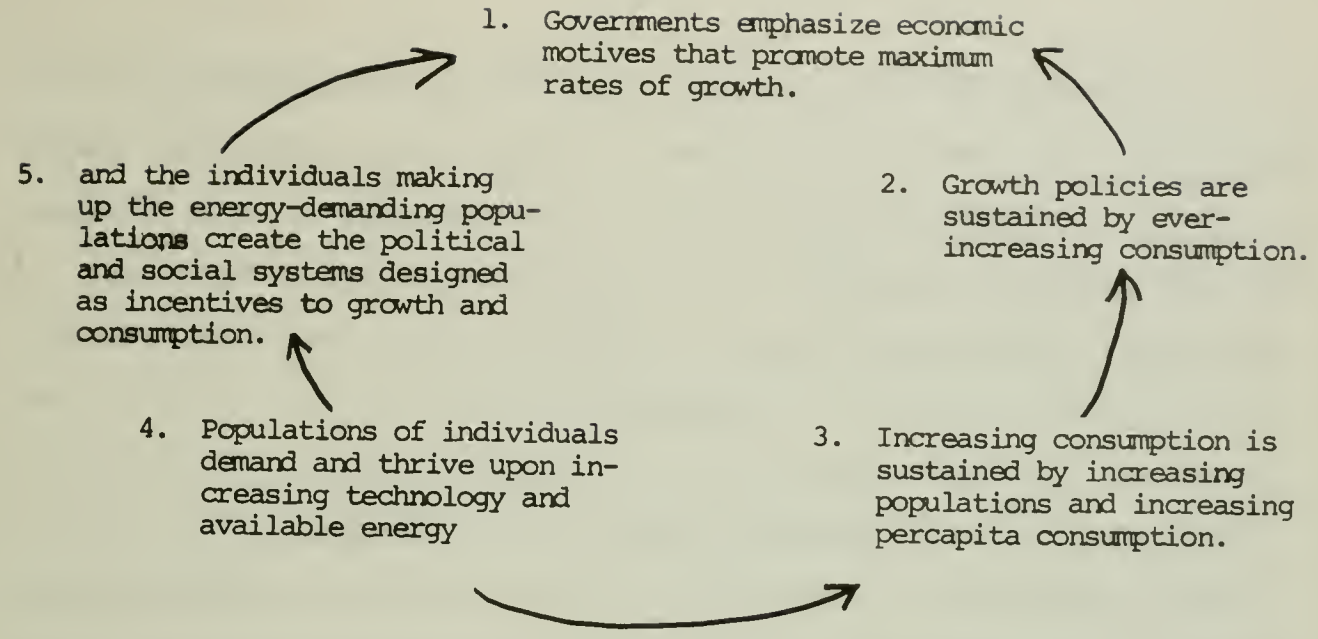
ENVIRONMENTAL GEOLOGY

UNIVERSITY OF MONTANA

I shall preface my specific remarks with an attempt to place the prospects for surface mining and reclamation in Montana within an overview of the role this state may play in the future of American economic development.

At this public forum, some of both the environmentalists and of industry representatives have treated us to prime examples of linear thinking wherein we define the problems and then merely require the application of more time, money and technology to effect a supposed cure to the problems. This complacent attitude has been going on in the nation for nearly the last decade. It is the kind of thinking that engineers, politicians, educators, economists, and even ecologists find easy, straightforward, and satisfying since it affords them "solutions" to the problems they envision. All these linear solutions achieve is the postponement of a problem or spreading it out over a period of time. Ultimately, a social or biological entity must meet the problem and recreate a self-sustaining, self-perpetuating non-linear solution which closes upon itself.

All natural systems, including man and his social sub-systems, are governed by circular, closed-loop processes. The dominant system operating in eastern Montana today, and in fact in the nation, is one in which man's social systems exert prime control. This system can be summarized as follows:


1. Governments emphasize economic motives that promote maximum rates of growth.
2. Growth policies are sustained by ever-increasing consumption.
3. Increasing consumption is sustained by increasing populations and increasing percapita consumption.
4. Populations of individuals demand and thrive upon increasing technology and available energy
5. and the individuals making up the energy-demanding populations create the political and social systems designed as incentives to growth and consumption.

This is a positive feedback loop, self sustaining, and closed upon itself. It is perfectly analogous to the closed nutrient biota loop that exists upon the eastern Montana plains to which we are directing ourselves here today. We think little of applying linear rules to the breaking of the nutrient cycling loop for strip mining since it is contended that the cycle can be re-established eventually, although not without some change.

In effect, some people in this state and nation are today suggesting that we can also break the dominant social-economic loop since one of its links is driven by individuals who partly control both the governments and the demands for energy. In fact, Montana has been offered, in 1972, a kind of economic growth-rate valve for the nation, located right here in the eastern part of the state, and we are being presented with a short-term opportunity to be able to slow down the rate of energy-money exchange in the social economic loop that drives this nation.

The opportunity will not last for long since desulfurization of other national coal reserves and development of alternate, largely nuclear, energy sources will ultimately supplant a coal-based energy economy, probably before the two hundred year

life of those national coal researves. But it will last for at least the decade 1985 to 1995, and the state is presently asked to decide how much control they wish to have over that national monetary energy flow valve.

The point is that the eastern Montana coal reserves are a national asset of far more import than gold in Fort Knox or foreign exchange credits. Coal is energy is money. They are precisely equivalent. At the present rate of exchange of about forty thousand BTU's per U.S. dollar, based upon costs of work driven by organic fuels, eastern Montana coal with an average of eight thousand six hundred BTU/lb. has an ultimate value to the national economy of four hundred thirty dollars and eleven cents per ton; yet is being mined and sold for two dollars per ton. Therefore, thirty billion tons of strippable reserves in this state have a net ultimate value at today's conversion rates of twelve trillion, nine hundred three billion dollars -- or about twelve times our present gross national product. This is most certainly a powerful value for the nation's growth rate.

Some environmentalists within the state of Montana are frequently criticized for their attempts to exercise some measure of control over the rates and modes of development of this coal reserve. To attempt such control over a national resource which is mandatorily needed to maintain the present rates of national economic growth, is said to be tantamount to the Balkanization of the State of Montana. This is clearly quite true, since this state can exercise such a degree of control over the economic growth rate of the rest of the country. By way of comparison, Alaska's ten billion barrel North Slope oil reserves are worth only about one-third as much to the nation in energy-monetary equivalents; yet many years and many millions of dollars has been expended by the federal government to date just to produce some semblance of an analysis of alternatives and impacts.

Now to specific points about mined-land reclamation, presented in the usual stop-gap fashion of we geologists and ecologists wherein we attempt to present indices of environmental degradation that the linear thinkers can attempt to react

to and to "take care of". Such is not an approach to improvement of the quality of life for those of us in the nation, but merely a means of insuring that a spot of land is returned to biologic productivity so that we can divert our attention to other nearby easily defined problems.

1. Successful reclamation should be defined as restoration to a state under which vegatative cover and nutrient cycles are as 'closed' as before man-caused disturbance.

2. Stable soil-vegetation relationships imply sub-climax vegetative cover that is adapted to the range of extremes, not means, of climatic and hydrologic conditions that have existed and may reasonably be expected to exist in eastern Montana for a period of several thousand years.

3. Introduced species may permit increased rates of succession to a stable community, but, ultimately, one would anticipate that dominant cover should be made up of native species of those particular genotypes that have evolved in the area. This means that a nursery or seed source of these genotypic varietals must be available and must be site specific to the particular microsites being reclaimed, not just to eastern Montana.

4. The key to reclamation is not in the management of the ground cover but in the management of the soil-plant combination best adapted to the site. This means that one should not strive toward most rapid growth or most vigorous green, but should strive toward that combination of plants, animals, soil, and soil micro-organisms that will permit long-term adaptation to expectable extremes of site climatic and other conditions.

5. Soil is not something that can be stored in a pile while mining goes on andthen spread back over the ground. Soil is a living biogeochemical substrate composed of partly weathered and stratified minerals, delicately bound mineral nutrients that are available to plants upon demand, but not available to leaching rainwaters, and living and dead organic substances and organisms that participate in the nutrient cycling between plant and substrate. The exact stratigraphic order of each two inch by four inch segment of the top foot or more of the soil must be preserved to facilitate reclamation to a stable community, and it must be kept viable. It has taken at minimum ten thousand years for the soil and its inhabitants to develop in eastern Montana and this soil is today still evolving.

6. To spread the so-called top-soil back over the ground has demonstratably increased the rate of restoration of lands in arid areas. However, part of the reason for this increase is that the homogenized topsoil behaves just as does freshly ploughed virgin land. It has its nutrient balance structures broken and releases its nutrients in excess to rain-

waters, thus producing vigorous plant growth, especially of a non-native species and weeds. This makes for high farm yields for several years, or in the case of mined land, creates nice places to take color photographs and promotional field trips, but it defeats the natural nutrient cycling mechanisms and will ultimately result in a reduced vigor, reduced population stability and retarded succession relative to adjacent undisturbed areas. Thus, one hundred years hence, the "reclaimed" lands will be less vigorous than those lands that have been undisturbed. Reclamation implies long-term management to insure population stability. Succession accompanying restructuring and renewed weathering balances in the soil take at least hundreds of years in the arid west.

7. To "upgrade" the land uses through reclamation to different base conditions will generally require more water than originally available at the site and may require fertilization with imported nutrients. Both of these actions should be avoided at all costs since they ultimately will impose an almost limitless burden on the company or state agency responsible for the reclamation. Neither water nor fertilizers are available in unlimited quantities and once conditioned to their use, the communities that develop will need them continuously, while the prices for such commodities will increase through time.

8. Reclamation implies replacement of the original water-holding capacity of the soil. This can be done either by preserving the soil structure and density-a virtual **impossibility** using presently available earth-moving equipment, particularly that associated with coal mining-or by artificially "remanufacturing" a soil using substances such as sewage, sludge or other organic wastes to reconstitute the stripped soil. Such manufactured soils may work, and may ultimately speed recovery of a natural soil profile; but we are not, to my knowledge, conducting the necessary experimentation to permit development of such procedures without possible negative side effects.

9. We at present, completely lack the necessary base-line data upon which to assess or conduct reclamation. We need careful studies of ecotypic and genotypic variations in the native and introduced species being considered for reclamation and we need sources of seed for those genotypes ultimately selected. We need observations of the year-to-year differences in extremes of environmental conditions that may reasonably be expected in eastern Montana--a region of extreme variation due to its severe continential climates. We need data on the effects of fertilization and irrigation on long-term soil fertility under proposed reclamation conditions, especially under the influence of airborne wastes that can be anticipated during the short span of development of these coal reserves (one hundred years) and under the influence of surface and groundwater changes in quantity and quality that we can anticipate associated with the mining.

In summary, the research effort undertaken to facilitate reclamation of those areas of Alaska impacted by the Alaska Pipeline far dwarfs that for reclamation of strip-mined lands in western United States and is still wholly inadequate. Since

more economic value is at stake in Montana than in Alaska, certainly a similar degree of reclamation effort should be undertaken here and similar degrees of severance taxation ought to be effected to insure self-perpetuation of the reclaimed land for hundreds of years.

LOUISE DUNLAP

COORDINATOR OF COAL COALITION

ENVIRONMENTAL POLICY CENTER, WASHINGTON, D.C.

I'm Louise Dunlap from the Environmental Policy Center in Washington where I'm a Washington representative working on coal legislation and coordinating the national coalition which is made up of more than forty citizens groups in nearly all the twenty-six states where coal surface mining is going on.

A word, I think, is merited as to who really got into the anti-coal strip mine movement first. I am an environmental lobbyist, but I was not there first, nor were most of the environmental groups. In fact, the movement to question and challenge coal strip mining, first came out of the coal fields of Appalachia, specifically in West Virginia, where deep miners living in hollows, having been forced out of the hills by large land companies buying up the land for coal companies (just like they are in eastern Montana), were forced into the hollows where they have been subjected to land slides and floods such as the one which occured almost a year ago this month, at Buffalo Creek, where refuse from deep mines and the combination of excessive strip mining and heavy flooding caused some one hundred and eighteen people to lose their lives.

The deep miners of West Virginia were really the first ones to question what was going on. Many people would say, "Why should deep miners care? They would probably like to work in any place other than a deep mine." However, there are many deep miners who do like deep mining as an occupation although they are fighting very

tenaciously to get strict enforcement of the 1969 Deepmine Health and Safety Act. Some of these miners formed a group which was at first called the Black-Lung Association. One of the members of that group, who later became president, was a deep miner by the name of Arnold Miller. Last year when he tried to testify before the House Interior Committee, he was not allowed to---this year he is president of the United Mine Workers.

The coalition is made up of deep miners, property owners, some farming groups, some ranching groups, consumer groups, environmental groups, and fisherman. In the last Congress, the ninety-second Congress we were unable to get a law enacted, but we were able to get a reasonably tough regulatory bill passed in the House of Representatives with a great deal of support from Congressman John Melcher of Montana. This year, we have a whole series of bills before us at the federal level. They range from a phase-out bill (HR one thousand offered by Congressman Ken Heckler of West Virginia), which would phase out contour stripping in six months and phase out area strip mining over an eighteen month period, to a whole array of regulatory bills. Hearings on these bills will be coming up in late February and early March, first in the Senate Interior Committee and later the House Interior Committee.

The composition of the committees will have a great deal to do with what happens in this Congress. In the Senate, Senator Lee Metcalf of Montana is the new subcommittee chairman who will be handling the legislation although it will be taken up by the full committee this time. In the House, Congressman Wayne Aspinall of Colorado was defeated, and has been succeeded by James Haley of Florida. The new

subcommittee chairman who will handle this legislation is Patsy Mink of Hawaii and we are looking forward to continued leadership from John Melcher who is now the new Subcommittee Chairman on Public Lands. So, we are looking forward to a good debate in Congress. We think there will be a federal bill enacted by the end of June, and although the Environmental Policy Center is supporting a phase-out of all coal strip mining, (while deep mining is increased), we are also working on regulatory legislation which would apply to other minerals.

That gets us to the topic of this panel today which is reclamation. It is somewhat difficult for me to discuss this because I'd really rather tell you about why I support a phase-out of strip mining. But before I get into that I would like to say that I think that we have all been somewhat brainwashed by the energy industry ad campaigns which officially began in 1970 with a commitment from the American Petroleum Institute to spend four point five million dollars telling the American public why "A nation that runs on oil cannot afford to run short." Just as our appreciation level for our energy dependence is peaking, we are now finding that we are in a "crunch". However, we should not confuse temporary shortages, as have been experienced this winter, particularly in the mid-western states, with the type of ultimate crisis which the energy industries would like us to believe is coming.

We have been told by Montana Power Company that there is no alternative to strip mining. However, I would like to tell you that the industry figures on strip mine reserves and the Bureau of Mines figures tell us differently. They tell us that nationally our deep

mine reserves out-number our strippable reserves eight to one, and that our low sulfur deep mine reserves out-number all of our strippable reserves by a ratio of five to one. And yet, we are told that we must go after the one-fifth first and that there is no alternative. In the State of Montana, where you are well endowed with low sulfur coal reserves which the eastern states and the Pacific states are anxious to gobble up, you should know that only one-eighth, or twelve per cent of your low sulfur reserves are strippable and that there is an option by various means of extraction to develop first your deep mine low sulfur coal reserves.

A word about what we would consider to be essential reclamation requirements for coal during a phase-out of coal strip mining and for other minerals which are also very definitely affecting our air, water and land. We would be supportive of a reclamation bill as an interim measure which would require that affected land be restored to a condition such that it may be used as it was prior to surface mining, with the exception of open-pit mining, which could not be restored to original use and would require separate reclamation plans. However, we are in full concurrance with the conclusions of Bob Curry, concerning the long-term recovery time problems involved and the fact that there are very few answers to how well we really can restore our lands on a long-term basis.

Congressman Ken Heckler of West Virginia has referred to reclamation as putting lipstick on a corpse. Even though you may see many fancy pictures of areas that have cattle grazing on them or may have been restored to agricultural use, I can assure you that for the most part these are showcase examples. They are short-term recovery examples

and we really do not know the long-term answers. Finally, we would be supportive of a regulatory bill which would place the burden of proof on the operator, not on the state and not on the people. We also support a permit system which would be based on selective approval, not selective denial, because when you get involved in a permit system, it is not a right to strip mine, it is a permit which involves privilege, and the burden of proof must be on the operator to demonstrate that he can and will reclaim the land. In the absence of that proof, the state should have no authority to proceed and issue a permit. The permit application must include specific information: borings showing how aquafers, subsurface water and soil are affected, what the chemical properties are, a complete reclamation plan discussing not only the mining process, but also a description as to what use the land will be put and exactly how that will be done and what demonstrated proof there is that it can be done, public notice and public hearings before permit issuance and bond release, and the written consent of the surface owner.

I think that the real issue in Montana is not simply whether or how quickly the coal will be developed, but whether you are willing to take your livestock culture in the west, which is your largest industry and transform it totally to a coal culture.

THOMAS A. GWYNN

KNIFE RIVER COAL COMPANY

I would like to start out by saying that reclamation has been conducted to some extent by the coal industry for more than fifty years. In some places it has been more effective than in other places; in some places the companies have been more energetic than in other areas. In the difficult areas that are mined in the Northern Rockies and the Northern Great Plains states, sometimes areas where vegetation can hardly be maintained even on the undisturbed land, (particularly in certain areas in Wyoming), tens of thousands of dollars are being invested annually by mining companies to research methods of successful reclamation. As many of you know, the company I work for and represent today has been involved in such research. We have supported research at the university level and have been actively involved in attempting to institute successful reclamation.

Our company has successfully completed reclamation at the present time, or has projects underway, on more than seventy-five per cent of the lands that have been mined. Parenthetically, I might comment that our only mine in Montana is at Savage where we are mining on the order of three hundred thousand tons per year to serve the power plant at Sidney. To mine this amount of coal, we disturb something over ten acres a year. To the present time, our total area of disturbance has been slightly in excess of a quarter section. By the close of 1973, we expect that all of the area mined, up to within approximately a year and a half of the current mining, will have been completely rolled and levelled to approximate the original topography

in the area. We are currently stockpiling the topsoil and are replacing topsoil to the extent it is available in that area.

We would like to point out that the reclamation laws have been enacted in the various states in this region, including Montana, Wyoming and North Dakota, are partly the result of cooperation of the industry and partly the result of the industry working with members of the various legislatures to bring this to pass. Our company firmly believes that we do and should have adequate and specific reclamation laws.

Last year, the company I work for joined in a news release with all of the principle coal producing companies in North Dakota (it also affects Montana to the extent of Knife River Coal's operations). The statement is as follows:

> "These companies have already begun restoring mined lands to a gently rolling topography capable of being traveled by farm machinery. Procedures have also been established whereby topsoil materials are to be saved and reapplied on the surface of the restored areas."

And I might comment that each of the companies are doing this at presen

> "Suitable grass cover or other vegetation will be seeded, and the vertical highwalls remaining from final cuts will be eliminated. The companies involved emphasize that the improved methods follow a continuing study by the firms since enactment of the Mined Land Reclamation Law passed by the North Dakota Legislature in 1971. They further stated that it will be their purpose to create conditions that will approximate the original appearance and characteristics of the land prior to mining. The future effect of mining the recently estimated fifteen billion tons of North Dakota lignite will involve less than two per cent of the state's surface area."

The statement goes on to list the companies that participated in this release. They included all of the principle producing coal companies and the utility companies that are supplied by those coal companies.

It is our belief that the legislation that will come out of this session of the Montana Legislature will undoubtedly accomplish just exactly what was agreed to by the companies in North Dakota and the program that's currently underway by Knife River Coal.

Rather than spend much time presenting some of my other remarks, I will summarize them briefly and then sit down. The industry, we feel, must be definitely in the lead in helping to develop effective reclamation programs and laws. This is necessary, not only as a means of restoring the land adequately, but as a competitive matter between the companies. And more and more of the companies are coming to realize that the ostrich approach will not work. Certainly the cost of reclamation has to be considered as part of the expense of mining the coal. The mining companies have to develop a new sensitivity, a new awareness, of the feelings and the requirements of the communities and the areas in which they work.

Comprehensive reclamation is possible. I can't agree with those who say it is not. And companies must aggressively achieve this, must find a way to accomplish this. I feel that we have to be somewha careful about criticizing those who are doing something about reclamation unless we can and unless we will do more than just criticize. Namely that we are willing to inject and propose alternatives and help to accomplish a better degree of reclamation. I am certainly aware that the prodding and criticism of the past by individuals and organizations has, in many cases, helped state legislatures and companies to come to the point where we are today, and they will undoubedly help to create uniform competition by requiring approximately similar standards of all of the companies operating in any given state.

To be truly effective in our environmental aims requires, I feel, the joining together of the best that industry and public and the environmentalists have to offer. And I can point certainly to the fact that in past history the most progressive periods of our nation's history have resulted when a common cause has welded together the many forces in this country. Certainly this is the aim that I would encourage and it is the aim I hope we will come to more and more in Montana and in this general region.

WALLACE McCRAE

PRESIDENT AND MANAGER OF ROCKER SIX CATTLE CO., FORSYTH, MONTANA

Although my address is Forsyth, the confusing proclivity of the postal authorities is indicated by the fact that there are five post offices that are closer to me than Forsyth. I live a few miles south of Colstrip. It is hard to be more specific in the distance that I live from Colstrip since it is decreasing each day - and I am not the one that is moving.

In my travels about the state, I am frequently asked two questions: Can strip mining be stopped? And can adequate mined land reclamation be achieved? My presentation will be an attempt to evaluate and answer these two questions.

First, can strip mining be stopped? Electrical power consumption in the U.S. doubles every ten years. The existing rate structure encourages high industrial use of electricity because the more that is used, the lower the rate. Since so much power is used by heavy industry (the aluminum plant at Columbia Falls utilizes one third of the power used in Montana), there is no reason to believe that there will be any reduction in the growth rate of electrical consumption. The demand for electrical energy and petroleum products, both of which will be increasingly produced from coal, coupled with our relative industrial, and so-called economic vacuum, a wealth of coal, water, clean air, sparse population, and low-priced land all indicate that we are going to see perhaps the largest and most rapid industrial development the world has ever seen right here in Montana.

The nation needs energy, both in the form of electricity and petroleum products. We in Montana are going to see our state attempt to satisfy an insatiable appetite for these products.

If the coal and surface were owned by the same owner there is reason to believe that coal development, while not being stopped, could at least be controlled

by the surface owner. Unfortunately, the coal and the surface ownership, in most cases, is divided. While I own most of the mineral rights on my ranch, I own only a small percentage of the coal rights. I only own the coal under about one percent of my surface, while about thirty per cent of my land has recoverable coal seams under it.

The problem of our educated youth being forced to leave Montana to find employment is about to be solved. Not only will we be able to provide employment for our laborers and engineers, but I am sure we will have ample in-state needs for our criminologists, sociologists, criminal lawyers, pollution control experts, and others in crisis-oriented professions. The problem might be further solved by our educated youth not wanting to stay in a state that has lost the quality of life that we enjoy at the present.

The Chamber of Commerce philosophy of growth for growth's sake, (which is the ideology of the cancer cell) will fit nicely into the scheme of the national energy crisis. Can strip mining be stopped? I don't think we could stop strip mining if everyone in the state were opposed to it. I understand that over eighty per cent of the public reaction to the power plants at Colstrip was unfavorable, but this opposition did not even slow down, let alone stop, their continued construction. Strip mining is an inexorable force, and cannot be stopped. Unfortunately, Montana in all probability will not even gain economically in the long run. The specter of Montana prostituting itself for the energy crisis is deplorable, but prostitution coupled with low financial return is intolerable.

If, then, strip mining cannot be stopped, can adequate mined-land reclamation be achieved? I think it can, but I don't think it will.

I believe that the same rationale that makes coal development an inexorable force, might well deprive us of meaningful reclamation. The same thinking process that dictates that coal development is such a good thing for Montana would be

logically inclined to deduce that you cannot afford to spend more money reclaiming an acre of land than that acre is "worth" after reclamation.

It seems to me that coal companies spend more time, effort and money trying to convince people of their good intentions, than they do in trying to implement these intentions.

After being inundated with propaganda about the low productivity and universal ugliness of my area, I sometimes wonder if the companies have ever really examined the country that they are disparaging. To me, I live in a unique, picturesque area that is economically among the best ranching areas in the state. After hearing the Crestafulli brothers quoted as creating an "oasis" in the desert concerning their sad efforts in reclaiming the old northern pacific spoil banks, people just don't believe me when I tell them that there were in the neighborhood of twelve million board feet of timber harvested in my county of Rosebud last year. The mining companies perpetrate and perpetuate the myth that they are farming while mining in a barren, treeless wastland, best described by Dante in his references to the inferno in the Divine Comedy. The logic apparently is that if you repeat the story often enough that my country is not only difficult and expensive to reclaim, but is such a barren wilderness that its hardly worth the effort - if you repeat this often enough then perhaps you can fool most of the people most of the time.

The Legislature is hesitant about passing meaningful legislation for fear of killing the goose that will lay the golden egg (which is incidentally another of those myths, in case you wondered.) In some instances, state agencies approach implementation of the laws that we do have with timidity, and an attitude of either benign neglect or geology.

Can adequate reclamation be achieved where people are lulled into a belief of reclamation success by a ten-acre "show case" plot of mostly annual plants?

Can adequate reclamation be achieved when mining companies continue to resist topsoil retention? Can adequate reclamation be achieved where even existing plant life will be endangered by the polluting emissions of power, and proposed gasification plants? Can adequate reclamation be achieved through reassuring reclamation rhetoric when in reality none of the companies presently mining coal in Montana have signed reclamation contracts under the 1971 Reclamation law?

I wish that I could be more optimistic, but I do not believe we can stop strip mining nor do I believe we can reclaim the former productivity of mined land. I sincerely hope that I am wrong.

TED SCHWINDEN

COMMISSIONER, MONTANA DEPARTMENT OF STATE LANDS

After nearly two years as administrator of the 1971 reclamation acts and after literally dozens of public appearances relative to mined land reclamation (capped off with testimony Friday evening to the Senate-House hearing), I find it most difficult to present novel ideas to this forum.

I think it unnecessary and redundant to detail and document the agonizing questions that our reclamation division has faced in its attempt to "get a handle" on the problem of reclamation. Suffice it to say that the number of solutions still falls far short of the number of questions left unanswered.

Let me begin, then, by simply restating my concluding comments before the legislative hearing. I do believe, that given sound legislation, strong administration and broad public support, the State of Montana can cope with the reclamation problems posed by projected coal mining development the next two years. My confidence in our capabilities to perform in the pre-1975 period is much more cautious.

Montana coal development has just concluded its fourth year of real growth. Because of the inevitable time lag in establishing a new mining operation, years five and six will be characterized primarily by expansion of existing mine operations Years five and six (1973-1974) are absolutely critical in terms of the establishment of adequate state control of surface mining damage.

If we choose (by decision, or by lack of decision) to rest in this coming biennium, we will have lost the opportunity to "get the handle" on coal extraction and its associated development. If we as citizens, administrators and legislators choose to ignore the critical nature of the biennium ahead, then we will be playing

reclamation "catch up," and I'm sure that most of you would agree that government by crisis is too often government at its worst.

The urgent need to stay ahead of coal-associated problems was recognized by those of us closely related to reclamation activity at least as early as 1971. Strong pressure from the Anderson administration in 1971 led to a Senate hearing in Billings in early 1972. The presentation made by the State of Montana at that hearing subsequently led to a letter from EPA administrator William Ruchelshaus to the Secretaries of Agriculture and Interior. Ruchelshaus specifically referred to the Billings hearing and expressed his apprehension in strong terms: "I am deeply concerned that the increasing pressure on state and federal agencies to permit development of these coal fields will result in a series of unilateral, uncoordinated decisions with a deleterious cumulative impact on the environmental, social and ultimately economic values of this region."

Despite our concerns, despite the perceptiveness of Mr. Ruchelshaus, the federal response has been less than heartening! And the recent news of emergency measures to meet the national "energy crisis" by the relaxation of environmental standards has been hardly reassuring.

On Tuesday of this week, I met at length with delegation staff and Senate Interior staff in Washington, D.C. to again emphasize the urgency of the need to control development. Early next week a research and planning program formulated by the Governor's task force will be forwarded to Washington (with price tags attached.)

The coal task force report and its recommendations reflect our commitment to using the next few years to come up with suitable reclamation solutions. Strong state reclamation laws are a vital first step toward avoiding the Ruchelshaus prophecy. Strong statutes and responsible administration must, however, be

reinforced by meaningful data. Data that in summary will tell us what we have in eastern Montana, how it should be developed, and how our resource can be rescued from degradation, if not disaster.

V

SOCIO-CULTURAL IMPACT

OF MONTANA COAL AND ENERGY DEVELOPMENT

CAROLYN ALDERSON

RANCHWIFE, BIRNEY, MONTANA

There is a story which I read to my children from time to time which I would like to tell to you. It's a story of Beatrice Potter and it's called Jemima Puddleduck. Jemima Puddleduck is a little duck that lives in a poultry yard and she has an annoying problem. Her eggs are always taken from her by the farmer and given to a chicken to hatch out. So she decides to go out on her own and find herself a hiding place where she can do her hatching on her own. In her travels to find this hiding place she meets along the path, a foxy whiskered gentlemen. The foxy whiskered gentlemen hears her problems and has just the solution for her. He takes her to his house to a special room that he has which he says will be very comfortable and an ideal place to have her eggs. She's a little nervous at first about the fact that it's a room full of feathers, but she decides the feathers are very comfortable and she proceeds to settle down. The foxy whiskered gentlemen further extends his amenities by offering her an invitation to dinner. She is so flattered by his attention that she asks what she can do to help, and he says he has everything all prepared with the exception of some sage, some onion, and some bread crumbs. So Jemima Puddleduck goes out and fetches the sage and onions and bread crumbs. Now because this is a children's story, Jemima Puddleduck is rescued, but the story serves to make my illustration.

There is a great financial feast, we are told, being prepared for Montana. Many sectors are so eagerly anticipating it that they

are already setting the table. But before we go further with the preparations for this feast, and before all the invitations are given out, we might take a look at the menu.

One half of Montana should not really have to explain itself to the other half, but it looks as though this is necessary one more time One cannot talk about eastern Montana without talking about the rangeland. Grazing livestock is the largest industry in the state. It is bigger than recreation and it is bigger than mining. Furthermore, the financial benefits of this industry stay in the state and are plowed back into its operating economy.

For the past several months, and with more intensity this past weekend here, the subject of coal has been hashed over from top to bottom. Reclamation is discussed: Is it possible to begin with and how do you regulate it? The other aspect of development that has been discussed is whether or not there will be energy conversion facilities built here. The consensus is that there will be. The extent and time frame of the development is discussed and how much and how soon, and are there alternatives to strip mining and steam generating plants?

There's a real hooker here. And that is that once enormous amounts of capital are committed (in land, water and facilities), the state will be on an irreversible track. Through all this discussion, one element has been conspicuosly absent; that element is the people of this region who are engaged in the state's largest industry and who are living on top of the coal. No one has asked them if they can coexist with coal development. No one seems to care about their preservation. The question has not been asked, "Which of the two

industries is the most important to the state and the nation in the long run?" It is our contention that the discussion of reclamation and power plant siting is purely academic if the intention is to industrialize what is now an agrarian community.

The very fact that grass is the primary economic base of the area, balanced with the production of crop for winter livestock feeding, means that people live apart from each other often over long distances. Each person operates his own place, in his own way, with the whole family participating in that operation. Therefore, families are close. Social problems that plague the rest of the nation such as divorce, delinquency, and crime are extremely rare. The roots are deep and the primary motivation of almost every rancher is to leave the place to his children. He is also aware every day of what was left to him by his forebears.

Until now, continuity has been the glue of all the factors that might otherwise make ranch life insecure, such as weather and markets. One always has a home. If a society without these values is superimposed upon the existing one, there will be friction. Even one strip mining operation and the construction of one power plant has proven this to be true. The people living there now will gradually be squeeze out as the inter-group friction increases and as the strip mining squeezes them slowly out of an economic operation. No one except the coal company will buy what ranchland is left and there will be fewer and fewer family operations. More and more the profit from the land will leave the state. The realization of this as a possible future for our area, combined with the devisive tactics of the coal companies, has already had a profound adverse psychological effect on the people

of eastern Montana.

The companies warn us not to be dupes of the powerful environmentalists, threatening that they will eventually not let us graze on public land. They say reclamation is easy and one will soon be producing more on your resculptured land than you ever dreamed possible. Air pollution is no problem, and water should stay in Montana for Montanans. Very good, but will we be able to use it for whatever fields are not inundated? And our cows? What will happen to the agriculture of places downstream in other states? We are told we are selfish because, (a) Montana needs jobs, and (b) there is an energy crisis that can only be solved by the strip mining of Montana's coal. The young people of Montana are leaving the state in droves, we are told because there is no employment. But I'll wager that if every graduate of every high school and every university in the state were handed, along with his diploma, the offer of a job in a strip mine or on a power plant construction job, or even in some of the backup services, that you would still have the same number of young Montanans leaving the state. And nobody has ever taken the poll of how many Montanans come back to the state after having tested their wings to go out and see what the rest of the world has to offer. And neither has there been a poll taken of the youth who would leave if the development does happen to the extent anticipated.

As to the strippable coal being the only answer to the energy crisis, there are too many facts [that we have just heard] against such a contention for us to be convinced. While there is so much widespread waste in both the energy resources and in the production of energy itself, nobody is going to convince me that it is un-American

to want to keep your home, when in fact, if there is an energy crisis, it is because of lack of industrial imagination both in managing the resources and implementing some of the alternatives that already exist. To say that coal which has been there for thirty million years must be used in the next ten or even fifty years is astounding arrogance in my estimation. It sounds as though the Creator were just waiting for us because somehow we were so special.

I would like to close with a quote from a book that should be required reading for everybody that wishes to understand all of the elements in the history of the State of Montana that brings us here today. The book is called: Twentieth Century Montana, A State of Extremes, and it's by K. Ross Toole.

> "And so America grew by eating itself; by devouring space and by devouring land. There is no more space to devour. So what we have left of what we once had has suddenly become precious because we cannot live without it. Montana is graced with an abundance of that vanishing commodity. It cannot yet, if ever, be translated into dollars. It cannot be measured because it is a thing of the spirit. It cannot really be quantified because it is a quality. If then, peering closely at the portrait, you see a face, as you will, which is battered and pitted and twisted and worn, move back, stand back, and look again. You will see an important face, and the longer you look, the more beautiful it will become."

ROBERT BAILEY

HEADSTART DIRECTOR

NORTHERN CHEYENNE TRIBAL COUNCIL

I would like to say a few things about cultural aspects of the Northern Cheyenne Tribe because I'm sure there are some questions in your minds as to what will happen to the members of the Northern Cheyenne Tribe once coal development starts.

I think that there are certain aspects which we have to look at first. One of the basic problems that the Northern Cheyenne face today is that they are on the lowest par of America's economic development. The tribe today is experiencing difficulties in providing for the welfare of its people. I'm sure there are people in this country, sitting on the corporate chairs of various coal companies, who feel that a mass of money is going to alleviate a lot of the Cheyenne's problems. But to my knowledge, this may work the other way around. I guess that is what I am here for today, to present to you what we feel might be the effect of coal development on the Northern Cheyenne.

The Northern Cheyenne reservation came into existance with the executive order of President Arthur in 1884. Since that time, the size of the reservation has varied but today it is approximately four hundred forty five thousand acres. Presently, the Northern Cheyenne Tribe has leased out sixteen thousand acres of that land for mining purposes to Peabody Coal Company. It has also permitted four or five other coal companies to explore for coal on approximately two hundred twenty seven thousand acres.

There are various opinions on the part of the many individuals on the reservation about coal development. Of course, we can't forget the fact that our people are

lowest on the totem pole of economic development programs in this country. We can probably point to various sociological and economic factors to explain why this situation exists on the reservation. But the fact remains that we are semi-literate and we cannot cope with the request of a coal company to mine our coal. We can be led astray by various promises and this is essentially what has happened on the first sixteen thousand acres of our land.

Many times the coal companies will come into the reservation and candy-coat a lot of the things that they promise the Indians. Consolidated Coal and Peabody Coal have submitted two different proposals to the tribe. One of the proposals from Peabody indicates that they would like to have the water rights, that they would like the right to use the water on the reservation. But again, this is a complicated process whereby the tribe would have to determine from the State of Montana just what type or what kind of water rights we do have. There are other problems related to these two proposals. Consolidated has requested the use of various tracts of land for development of a new community.

Some of you have travelled through the reservation and you have noticed some of the conditions that exist. But as in any other community outside of the reservation, a sudden influx of people creates a chain reaction and a lot of problems. Many of these problems have already been discussed here this weekend. They are going to have to be dealt with in various communities where the coal development is going to have an impact. These communities are going to have to be looking for other sources of revenue to meet the demands for services that people are going to hav

Economic development or coal development in areas of Montana other than the reservation may have advantageous effects. In these areas there is an economic and social structure which enables there to be planning, but this is not true on the reservation. It is my feeling that if there is no preparation or planning for the coal development on the part of our governing body, then those of you

that live in Billings, Sheridan, Forsyth and other nearby communities can expect a large influx of Cheyennes.

Let me give you a picture of the coal development as I see it as it relates to the culture of the tribe. The number one problem we expect to see will be law enforcement. There is not a clearly established relationship between the law enforcement program on the reservation and that of the state. There are three codes that apply to the reservation, the federal, the state and the tribal. Presently, those non-members of the tribe that live on the reservation are partially immune to the tribal ordinances and litigation on the part of tribal members, therefore, it is kind of a prehistoric thing. In cases involving members, there is no litigation whatsoever. If you can imagine the situation with thirty or forty thousand non-members on the reservation, you'll agree that there are going to be problems.

Educational systems are not the best. Approximately four or five per cent of the population on the reservation have any kind of a college education. About thirty-eight per cent of the reservation's twenty-five hundred people have an educational achievement above the eighth grade, but below high school graduation. The rest have achieved only an eighth grade education.

Other problems that may be brought about by the impact of the coal development will be directly related to the tribal tradition. I see in this audience various people and I'm sure you come from various stock. Maybe back in your ancestry there were tribal ties or group ties. This is one thing that we fear will be annihilated. We are not accustomed to the technological age of our society, an age in which a group of people that we call a race are measured by thoses standards which have been established by society. Education is one of these. Supposedly education is to assist and to be used as a tool to gain a better standard of living.

I could venture to say today that the Northern Cheyenne don't have any problems. If we were left alone, the way we wanted to live, I'm sure we'd be better off.

But in order for the Northern Cheyenne to get into what we call the mainstream of life today, there has to be an equality of existence. We are at your feet and at the feet of the corporate structures and the economy of our country. Now we are again being asked to relinquish some of the things that we still have - our land and resources.

We have been referred to in different terms through the history of our country, but we are really just like you. We are no different than anyone else. The Northern Cheyenne (and I think I can probably safely include the other Indians of our country) have taken the back seat. I have been reading some books by sociologists and anthropologists who are examining the urban crisis and looking for answers as to why we have twenty million poverty-stricken people in our country. We are included in that twenty million. And I could probably point out to you some of the characteristics and traits that we have which place us in that category. We didn't get there by our own initiative. The dominant society believes that subcultures must conform, and we are at that state. We are conforming to the dominant society, but to suddenly receive millions of dollars in our locality is certainly going to have a devastating effect on our people.

In closing, I would like to say that there needs to be a closer relationship with the State of Montana and with the counties to permit the members of the Northern Cheyenne tribe to become members of the main stream of life in our country.

J.W. BRADLEY

CHAIRMAN

SAVE OUR CUMBERLAND MOUNTAINS

PETROS, TENNESSEE

I've been pleading with these gentlemen up here to give me more time. They want to hold me to about ten minutes, but I said, "Well, other people don't know as much about strip mining as I do - they have not lived with it as long." But they said that I didn't have the time. None of this is written down; I have this paper to hold onto to keep from shaking.

I didn't know that the speaker before me would be an Indian. Some of my statements are about Indians. I can't understand why the intelligent white man thinks he knows so much. The Indian, without computers, looked at the buffalo and knew that the hump on the back of the buffalo was good, but they didn't kill the buffalo for the hump. That's what the white man wants to do to the land. They want to get the quick coal, the easy reserves, the ones that they can make the most profit on. They're not interested in what's right for the people; it's how much this land or these reserves will put into their pockets. With the Indians, the man he did the hunting, the fishing and some of the other things. The women did the tending of the fields, the cooking and the child rearing. But the smart white man thought he could improve it. The dumb women today say we want to go back to that. I'm for it. I'll certainly take my fishing pole anytime my wife will go to work.

I've got a paper here entitled, "Mining Coal - No Boost to the Income." This was a study made by TVA and I might add that TVA is a creation of man. In 1933, Congress saw fit to create an organization to preserve natural resources and provide flood control. I don't know where they missed the boat. TVA worked along these lines for a few years. They would find a farmer out plowing the hillside in the wrong

direction and they would spend hours showing him how to plow that hillside. Today, they're taking D-9 dozers, they're stipping coal and they're tearing up mountains and pushing them over the side. TVA is in on this themselves. They're the biggest contributer to water pollution, air pollution and destruction of land and timber that we have in our state.

We have another thing that was created by man. I work there, at K-25 Oakridge National Atomic Energy Plant. They created the atomic bomb and I wouldn't be surprised if you could still find evidence of the destruction that it did in the area where it was first dropped during the war. Appalachia is destroyed, nearly. Studies tell us that there are sixty years of strippable coal reserves remaining in Appalachia. If we can save part of Appalachia, we can use the remainder of it as a monument to the rest of the country to demonstrate what strip miners have done. TVA and strip mining are as destructive to Appalachia as a small atomic bomb would be.

The study I referred to a moment ago shows that the level of individual income in counties where there was no strip mining was twenty four dollars a year more than in counties where there was strip mining. I've kidded with some of these people out here and I told them that I ought to come out here and encourage you to go ahead with strip mining because that would relieve some of the pressure on us. There are a lot of operations that would like to come out into these big coal seams--but I'm not that type of person. I'll fight with you as long as you'll stay with me.

The average annual change of population in strip mined countries between 1940 and 1970 represented a loss of one point one per cent compared with a loss of point nine per cent in non-mining counties and a gain of six per cent for the entire valley. In 1969, analysis showed that the individual income was one thousand, eight hundred seventy-three dollars in the strip mined countries, one thousand, eight hundred ninety-seven in the non-strip mining counties and two thousand seven hundred fifty-nine dollars in the valley as a whole. The average annual individual income figures for both the strip mined and non-strip mined counties was fifty-one per cent

of the national average.

I was over at your capitol yesterday when they were discussing the eminent domain bill. You can use the example of a cow to explain what the strip mining companies want to do to the farm land. The farmer owns the hide. The minerals are the functioning parts of the body that makes this animal live. The water is the blood in the veins of this animal. The muscle is the coal. If the farmer's looked at this the way that the miners do, they'd take their important parts out of this animal and let the strip miners have what's left. But no, people of Montana came here because they were being crowded in the east. They wanted distance. They didn't want to put up with pollution. They were a hardy people, they traveled many miles to get away from the thing which is coming to them now. The strip mine company wants to come in and take their coal, but then what does the farmer have left? All of his cows are going to die because they won't have the muscle to operate. The blood, or the water, in this area will not be the same. And if you think it will, you should come and see some of the streams that I've seen.

You say you've got laws in the land. The Indians know better than you, and I know nearly as well as they. We've taken everything that we had to work with, every bit of power and our money (which is small). We went to the water quality people and we said, "We have a problem, our creek is getting filled up with silt." They said, "You do have a problem, we'll check into it." That was about 1970. We had a survey of the creek done and it showed where the creek was being silted up. It was directly from strip mine runoff. So we messed with the state for awhile trying to get something done. We went through the Department of Agriculture and everybody said, "You've got a problem, we'll help you." Eventually we said, "We give up on this outfit." We went to the federal level. We told them our story. They said, "If you can prove this, we'll help you." So we sent this survey to the

federal government, they looked at it and kept it for about six months. Several letters were written, several telephone calls were made and eventually they said, "This is a state problem, you'll have to take it to the state. We don't have the money to do it."

So then we started again. We have a water quality law. (I might also add that we have according to our Governor, one of the strongest strip mining bills in the nation.) This law says that you must apply for a water permit. Water quality was set up under the Department of Health. We got them to come up into this area. They looked at the situation and they said., "You've got a problem, we'll help you." Well, we messed around with them for awhile and finally we gave up on them. We figured, well, these state officials don't make much money anyway, so the coal industry can bribe them a little bit and that's it.

So we go back again to another federal agency, the U.S. Army Corp of Engineers. They sent a young man down who was in law enforcement to check the water. This young man said, "You all have got a problem." He said, "I'll do everything in my power to see that there is something done. These silt traps are in violation of the law, the water turbidity is too high, the acid content in the water is too high." I kept calling this man and writing him, but I could get no reply from him. I asked somebody to check and see what the trouble was. They told me that he was no longer employed with the U.S. Army Corp of Engineers.

We wrote the Attorney General. We have tried to get lawsuits together and we have found that when you try to law somebody for something that they are supposed to do, the law is not for the person who is in the right, but for the person who has the money. Economically, strip mining is not for the people, but for the operator. Religeously, it's a sin against the ground itself to treat it this way.

The Bible has been used in some of the discussions that I've been listening to here, so I'll refer to it because I believe the Bible is true. I believe the man that made this earth knew far more about how to put it together layer by layer

than any strip miner I've ever seen. You can't scramble the mineral deposits in the earth then put them back and expect them to operate the way that they have in the past.

I made a little statement the first night I was in Helena. I told the people that they should ban strip mining. Someone said "It's a funny thing how a man can get two hundred miles from home and become an expert on everything." I'm no expert. I can tell you that I don't understand statistics. I can hardly say it. But one statistic is that each family has one and a half children. You show me this half child. Explain it to me.

You're always supposed to tell a joke. I've got a couple of 'em. I've got a book in my pocket. It's an argument for strip mining. I've got some disagreement with this, as I usually have with anything else I see. You can read it from where you're sitting. One of my disagreements is that there are too many pages in this book. None of the pages have anything on them. There is no good argument for strip mining, but there are several against it.

These engineers are a group of people, and I'm not against all engineers. (I have a brother-in-law who is one.) Scientists, I've got some friends that are good. Well there's a little story about how you tell the difference between a cowboy's boots and the engineer's boots. The inside of the engineer's boots don't have to be as dirty as they are if he'll tell the truth to the people. They've got the facts. They won't submit them because it's more money to them to keep them from you. In our area, they won't allow them to strip mine on a mountain that's facing an interstate highway or a recreation area because they know that what they are doing is not right. And they know that the more people who see it, the quicker they are going to be put out of business.

I invite any of you to come to Petros, Tennessee. I'll guarantee you something to eat, and I'll take you for a tour. Appalachia is badly damaged. But if Appalachia

can be a monument to the ignorance of strip mining, then it's not a complete waste. If you want any part of strip mining, come and take pictures of Appalachia, but keep it out of your state.

C.R. DRAPER

MONTANA DIVISION OF PLANNING AND ECONOMIC DEVELOPMENT

To arrive at a reasonable idea of the social and cultural impacts of coal development in eastern Montana, it seems to me we have to answer the question, "Impacts compared to what, and based on what assumptions?" We might assume, for example, that eastern Montana represents the stable social and economic adjustment of a normally growing population to an environment that is more or less fixed. Then, a sudden, extreme set of changes resulting from the rapid exploitation of its coal resources could be expected to bring about some fairly predictable impacts:

A large population influx would mean sudden changes in what economists call the "infrastructure" -- the physical manifestations of the economic system. There would be changes in the components of the economic base, with mining and manufacturing taking a much larger share than before of the total production for "export" from the area. There would be large new sources of tax income, but possibly even larger claims on that income to pay for new and rapidly expanded services. Changes in land ownership and use, for varying periods of time, might involve three per cent or more of the land area, with possibly nine hundred fifty people living on that land being directly and personally involved. Some of the current residents would find their life-styles changed in ways they would not choose; and practically all the newcomers would represent life-styles, and in many cases income levels, differing from those now typical of the area. Because much of the coal lands, and still more of the coal rights, are owned by the Northern Cheyenne and the Crow, there would be increased chances of ethnic differences and conflicts. But although some of these impacts will have to be planned for, I do not, as they say, "buy" the whole list by any means. In the first place, the assumptions don't accurately describe the situatio

in eastern Montana. In fact, the expansion of the export-base for its economy would slow down or reverse some of the trends that have troubled the area for forty years or more.

The fourteen counties containing strip-mineable coal have, in the last forty years, lost twelve to thirteen thousand of their former population size. Since 1950 alone, if all the people who have moved away had been able to stay, and had multiplied at the same rates as those who did remain, there would now be one hundred, fifteen thousand people, or forty per cent more than now live in the area.

Dr. Carl Kraenzel, formerly of Montana State University (now of the U. of Texas), as well as other sociologists, studied the social and economic problems of this area for twenty years and have pointed out some of the difficulties. He (Kraenzel) called them the "social costs of space" that confront many (but not all) of the people living there. They have lived in communities, some of which have grown, but more that have dwindled in size and importance, faced with decreasing tax bases and ever more costly needs for services, for public education, and for the amenities they have a right to expect. He points out the decreasing opportunities to make a living and consequently situations in which a father and his growing sons cannot share in an existing agricultural, commercial or professional enterprise without the prospect of each lowering his level of living.

The second reason I don't find the above list of impacts very believable is that the seriousness of social and economic impact depends greatly on how fast the adjustment to changes must be made. I think we need to take a hard look at the basis for some of the dire predictions that have received such publicity in recent months. What is the reasoning behind projections that would make Forsyth into a Scranton, or Colstrip another Donora?

One of the highest population-increase projections I have seen is based on

assumptions like this: First you must assume that the hypothetical multi-million dollar Montana-Wyoming Aqueduct proposal suggested by the Bureau of Reclamation study is actually going to get funded and built. Then you must assign all the water for industrial use made available by that plan to just one kind of plant, coal liquefaction and chemical conversion because that is the largest user of manpower per ton of processed coal. The result would be forty-three such chemical complexes, which could bring about population increases in the hundreds of thousands. But how many of those forty-three plants have been actually proposed for Montana by companies large enough to command the hundreds of millions of dollars it costs to build each one of them? The answer is none; not one. Another persistant idea is that we are going to see the coal resources blasted out in thirty to thirty-five years, leaving behind all the problems of still more ghost towns for a Montana which already has its share. That would mean averaging about a billion tons of coal a year.

But now, take another look at what is actually happening. From 1971 to 1976 the firm prospect is for Montana to increase its output from seven million to twenty three million tons a year. But to exhaust the resources in thirty-five years we would have to mine nearly forty times that much, starting right now. If we went on increasing production as fast as we are in the next five years, we would run out of strippable coal not in thirty years, but in one hundred and thirty years.

A recent report from the University of Montana points out quite rightly that all it would take to use up our coal supply in thirty years would be to build nineteen mammoth coal gasification plants -- each one twelve times the size of the existing European plants -- and also some sixty-nine thousand megawatts of electrical generating capacity.

Once again let us look at the prospects for any such massive developments springing up. Of the nineteen gasification plants, there is actually one proposed (for Montana) plus another, one quarter its size, for either Montana or Wyoming.

There was another of the big ones announced somewhat prematurely, but the Northern Cheyenne are reported to have turned it down. Of the sixty-nine thousand megawatts, seven hundred are now under construction and there are plans reported for another fourteen hundred by 1979 -- a total of twenty one hundred out of the sixty-nine thousand with rumors of the possibility of another five thousand or so to be built sometime in the future at unspecified location. One plant originally planned for Montana will now go to Wyoming where they found a little more warmth in the climate for development.

The point of all this is not that we should feel complacent about the prospects for undesirable social and cultural impacts, but that the plans and preparations we make should be based, not on what might conceivably happen, but on what is reasonably likely to take place. That is the reason, of course, for the research proposal Governor Judge spoke about. Really large-scale coal development is not inevitable in Montana, nor is it inevitable that any development must bring social chaos. Montana has already had the good sense not to emulate those states that allowed uncontrolled strip-mining for sixty to one hundred years before they got around to enacting effective legislation. Let us hope that we can welcome the favorable impacts, minimize the unfavorable ones, and that good sense continues to prevail.

DR. ELDEAN V. KOHRS

COMMUNITY PSYCHOLOGIST, CASPER, WYOMING

A housewife, after fighting mud, wind, inadequate water or disposal systems, a crowded mobil home and muddy children all day, snaps at her husband as he returns from a sixteen-hour work shift. He responds by turning around, heading back downtown and spending the night in a bar trading stories with men from similar circumstances.

The results are divorce, tensions on the children, emotional damage and alcoholism---in short, more additions to the list of human casualties in life's battles. It is a situation not unique to any section of present-day America. There is at least one condition under which such situations seem to accelerate---"boom town" conditions. In the community referred to above, this pattern was coined the "Gillette Syndrome." After the first several days in the community, a feeling of dislike was expressed followed by growing resentment over living conditions. Care was necessary in the expression of one's feelings because of the rewards of high employment and pay for overtime. Two weeks later a loss of appetite and inability to sleep developed. Within a month servere depression, thoughts of suicide and in many cases, excessive drinking occurred. Every community affected by rapid expansion, the "yo-yo" changes of a military base or boom characteristics associated with mineral extraction, undergoes its own unique social and emotional stresses but the results tend to be similar and the cost is human wastage.

The history of America is punctuated by these changes which have

resulted in more incidences of social chaos than in examples of the community planning which experts feel essential to the type of community people want for their families. In fact, it is not uncommon for managerial personnel to maintain families in established communities while commuting to the "boom" communities for their business. This too results in the emotional stresses associated with absentee husbands and fathers.

Boom communities result in such advantages as high employment and good athletic teams as well as the disadvantages of crowding and competition between the "ins" and the "outsiders." Children usually feel these changes most acutely because they have had little experience in dealing with the struggles that accompany social changes.

While most of my personal and professional experiences have been in communities benefiting from financial growth, the results are not beneficial to all. Many benefit; others suffer bankruptcy and poverty. Neither group is immune to the effects of emotional stress. The worker and his family fight frustration with living conditions while the landowner watches his land taken from him. When the landowner owns the minerals underneath the surface he can tolerate and even enjoy changes in the land surface. When he does not own the minerals, however, the psychological effect of watching one's source of living being destroyed is similar to losing one's family in a tragedy. This problem is most severe when strip mining is involved or where homestead acts or purchase agreements were made before the problem of separation of surface and mineral rights was anticipated.

The "boom" quality of communities has many similarities to parent-teenage conflicts. The teenager states, "I didn't ask to be born," while the parent demands certain conformity to existing

norms. The teenager does not like the change while the parent expects acceptance of common thinking about established policies. The resultant conflict is inevitable and usually destructive because of a breakdown in communication and appreciation of the opposing goals for existance.

It is impossible to discuss industrial resources apart from human resources. Since the human potential is frequently seen as replaceable, it is relegated to the secondary and irreplaceable status of energy production. We frequently forget that there are costs connected to "better living."

As a professional in the field of social psychology, it is impossible for me to ignore the effect of human wastage. It is one thing to be concerned about people as a do-gooder who does not like to see people suffer. It is quite another thing when human wastage is translated into economic costs. Human potential is our greatest resource yet it is subject to our greatest abuse in the name of technological growth. We speak of air and water planning yet neglect the need for planning of human resources or community growth.

In a "boom community" the costs of human wastage in industry occur as alcoholism, accidents and absenteeism. These are a natural result of long hours, attempts to cut corners in employment practices, trying to "do too much too soon" without planning and resulting in increased family problems.

We can add to these the social costs of the "three D's"---depression, divorce and delinquency. Suicide becomes a tool to regulate the lack of human concern. It is the ultimate method to express that something is wrong and needs changing. The threat causes

a selection of priorities. In high pressure situations they can occur at the rate of one per week in a community of eight thousand where the author worked for almost four years.

When neglect goes beyond tolerable limits, divorce is a natural consequence. In Wyoming, it is estimated that ninety per cent of ADC cases are the results of divorces where the husband is in contempt-of-court for child support. Someone has to pay for the cost of child support in divorce and most often it is the taxpayer. Spouses do not marry in order to experience loneliness or cope with the stress of company demands that keep husbands away from home for excessive work shifts.

Delinquency results in a conservative cost to most communities of thirty dollars a day if the child is institutionalized.
No parent wants his child "busted" for drinking as a minor, possession of drugs, truancy from school, running away or otherwise breaking the law. Yet, when the tension becomes so great that communication is non-existent between Mom or Dad, the outcome is like the "handwriting on the wall," leading to legal difficulties.

One's life style in a "boom community" is due to the balance between rewards, and punishment encountered. We may look for excuses such as wind, "cowboy" types, "freaks", wealth, or parental permissiveness, but the real reasons come down to the quality of life for which a community is willing to plan. Are plans made for job advances, community recreation, health care, day-care facilities, transportation systems, housing and school facilities? The pattern a community sets, most often becomes the way the community will continue to exist.

Studies with rats indicate that subjects alternately shocked and rewarded become equivalent to psychiatric cases. In Wyoming, the cost is about twenty-five dollars a day for state hospitalization. Other studies of rats indicate that when there is overcrowding of a rat population, they try to kill each other. Rural areas have little or no experience with land-use planning; consequently suicide and homicide tend to be high. The more capable a community is of doling out rewards and punishments, the more likely the cost of human wastage is to increase.

Another significant psychological effect is the type of influx associated with a boom growth. The demand for labor draws heavily on the marginal unemployed worker from other localities. The result is a high concentration of psychopathic personalities prone to illegal behavior. Merchants welcome the increased sales but moan bad checks, break-ins, and increased crime rate. The result is increased law enforcement costs.

Changes in community growth result in stresses that have price tags connected to them. These costs are measureable and can be calculated in terms of human wastage when industrial growth does not include plans for associated social changes. These changes involve recreational opportunities, law enforcement, welfare, and educational costs.

BILL CHRISTIANSEN

LIEUTENANT GOVERNOR OF MONTANA

For two days a wide range of expertise has expressed a broad range of philosophy relative to the development of Montana coal and all the known satellite effects. My schedule as president of the senate did not allow my attendance on Saturday so I have not had personal exposure to some of the thoughts that were exchanged here. I think this would perhaps be all the more reason that I should follow Bennett Serf's rule of the three "B's" of public speaking: be brave, be brief and be seated. And the late hour would further support this approach. Since it is impossible for me to summarize this public forum with fairness, I will resist the temptation to use these final minutes to break new ground or selectively emphasize forum conclusions.

Each individual in a lifetime makes a multitude of decisions, many of which are important, far-reaching and significant decisions, such as choice of educational endeavors, choice of a career, choice of a marriage partner and many others. In most instances these important decisions are generally accomplished only after careful introspection.

The collective public is occasionally called upon for decisions too, and rarely are these public decisions clearly defined, or in many instances, even recognized before they become totally crucial. As an example, Vietnam was hardly an issue in the early 1950's; half a generation later it dominated and divided our nation.

Only a decade ago economic development was an important public issue in Montana -- so it remains today. However, today there is a significant difference in the public attitude. The Montana public of the early '60's appeared committed to a policy of growth, growth at almost any cost. But today the Montana public of 1973 is searching into and examining its conscience. We realize that infinite demands for energy and material products cannot be met forever by a finite resource.

Coal, an ignored, if not until recently an almost forgotten resource, buried beneath much of eastern Montana, has both forced and motivated Montanans to look at their future as never before in our state's history. But coal and its extraction is really not the fundamental issue. It is only the tip of the iceberg. Surface disruption, esthetic destruction, pollution, water consumption, population concentration, these are some of the concerns associated with coal development.

But the dilemma is even much more fundamental. The dilemma simply stated is: Can Montana permit significant economic development under the most favorable circumstances and still maintain those qualities of Montana life which appeal to our citizens?

The soul searching which has gone on along with the confrontation over potential coal development has served as a vehicle to make all of us truly appreciative of what a fine quality of life we have here in the state of Montana.

The Legislature has always been kind enough in the past to allocate me one, what they like to term, "homespun story" and I hope that your public forum will accord me the same privilege. During

my campaign for the office of Lieutenant Governor, I was part of a political poll, the primary intent of which, of course, was to measure the candidate's position in regard to his chances for election. At the particular time the survey was done, it broadened beyond that measurement and the polling firm sampled attitudes of Montana people. I had been promised that I would have the results of my personal race in the poll by approximately Labor Day but since these results did not arrive by that time, I checked with the man in Washington, D.C. doing the poll and he said: "I am sorry that I have not been able to mail the conclusions to you but I am going to give this information to you over the phone." He went on to give me the information, then he asked, "Have you put together all of your advertising in the sense of your billboards and your T.Y. shots?" I responded, "Yes, what little I am going to do." He went on to say that in the fifteen years he had been conducting polls in thirty states, something came out loud and clear to him about Montanan's and their attitudes. Never in all of his experience had residents of any state showed such fierce pride in their state. This was true of all Montanans, but particularly true of those who had become citizens of Montana most recently. I could tell he was truly amazed that in all the sampling he had done it had come out loud and clear--fierce pride in our state seems to be an almost unanimous attitude of all Montana residents.

As we here in Montana are being deluged by requests to produce ever increasing quantities of low sulphur Montana coal, we must use that fierce pride always as a measureing stick to see the long-range effects of this development on our Montana resources, both natural and

human. I think we have within the legislative process now, several reclamation bills that could be melted into one strong bill with adequate muscle to protect Montana's coal bearing areas. (And you remember that I am particularly sensitive about this since production is now occuring, and is proposed to occur, almost literally in my backyard.)

Discussion of coal inevitably brings forth visions of Appalachia. Because of the North Central Power Study, the Four Corners development fiasco and even the daily television reminders of urban crises and all of the problems of the central city, we are now taking a longer look at our hole card.

Coal is but the surface symptom of a time for decision. Montana coal and energy development, the subject of this two-day forum, is a catalytic issue that requires of Montanans a decision of unprecedent magnitude. It is really not as simple as to develop or not to develop. It could be to develop slowly or to develop rapidly -- or it could be to develop slowly or not at all.

My recommendation to you as you leave for your homes and scatter throughout the state of Montana is this: Let the ultimate decision be made fundamentally by Montanans. Let all discussions of this particular kind be characterized by a maximum of facts and a minimum of emotions. And finally, may those in public offices -- in the executive, legislative and judicial branches of Montana Government and that of the United States Government, have the wisdom and the courage to determine and to implement the decision of the people.